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REPORT

OF THE

BARRACK AND HOSPITAL IMPROVEMENT COMMISSION

ON THE

SANITARY CONDITION AND IMPROVEMENT

OF

THE MEDITERRANEAN STATIONS.

Presented to both Houses of Parliament by Command of Her Majesty.

G. B., War Office Commission... Improving
the Sanitary Condition of Barracks, &c.

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INSTRUCTIONS.

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War Office,
14th August 1861.

Gentlemen,

In accordance with what I perceive to have been the intention of my predecessor, I have to instruct you to proceed to Gibraltar, Malta, and the Ionian Islands, for the purpose of making an inquiry into the Sanitary Condition of the Hospitals and Barracks.

You are to take for your guide generally the instructions formerly issued to the Barrack and Hospital Improvement Commission.

You will carefully examine the state of the existing Hospitals as respects both size and internal arrangement with respect to the average number of patients to be admitted. You will report your opinion whether any additions to each Hospital are needed, and whether any improvements can be made in the distribution of its rooms.

You will further make any suggestions for the improvement of the Hospital arrangements which may occur to you.

In making your Report, you will bear in mind that the garrisons in the Mediterranean are to be assumed at their existing strength, and that no large grants are likely to be voted by Parliament either for the erection of new hospitals or for the enlargement of the existing hospitals in the Mediterranean.

You will, of course, on your arrival at the stations indicated, report yourselves to the chief civil and military authorities, with a view to their assistance and co-operation in furtherance of the objects of your expedition.

I have, &c.
(Signed) G. C. LEWIS.

Captain Douglas Galton, R.E., F.R.S.,
J. Sutherland, Esq., M.D.

REPORT

OF THE

BARRACK AND HOSPITAL IMPROVEMENT COMMISSION

ON THE

SANITARY CONDITION AND IMPROVEMENT OF THE MEDITERRANEAN STATIONS.

To the Right Honourable Sir George Cornewall Lewis, Bart, M.P., Secretary of State for War, &c., &c.

Sir,

In conformity with instructions received from the late Lord Herbert, and confirmed by your letter of the 14th August 1861, directing us to inquire into and report on the sanitary condition and improvement of barracks and hospitals at the Mediterranean Stations, we proceeded to examine these stations in the latter part of September and during the months of October and November 1861. We put ourselves in communication with the Officers commanding the troops, Commanding Royal Engineers, Principal Medical Officers, and Civil authorities at each station, from all of whom we received whatever assistance was necessary for our inquiry, besides much valuable information on various points within their several departments. In carrying out our inquiry, we examined minutely the barracks and hospitals, together with the sanitary state of the dwellings of the civil population in their immediate vicinity. We found it necessary for the completeness of our inquiry to call for statistical and other documents requiring time for their preparation, a circumstance which has led to delay in presenting our reports in their present form. But various measures of importance suggested themselves, which were pointed out on the spot. Others were subsequently recommended by us, and our reports on the two most important stations, Gibraltar and Malta, were sent out to these stations as soon as they were completed, in order that practical steps might be taken on them at the time, so that no unavoidable delay has occurred.

In the following report we propose to give, in the first place, a general account of the condition of the stations, with a statement of the principal sanitary defects which came under our observation. We shall next describe the structural improvements required for removing existing defects, with the general principles which ought to be kept in view in executing the works, and the points in which improvements for barracks and hospitals in these climates necessarily differ from those recommended by us for barracks and hospitals at home. We shall then give the detailed reports for each station.

PART I.—GENERAL REPORT ON THE STATIONS.

The following is a list of the stations we examined :—

1. Gibraltar.
2. Malta and Gozo.
3. The Ionian Islands, including—
    - Corfu and Vido.
    - Paxo.
    - St. Maura.
    - Ithaca.
    - Cephalonia.
    - Zante.

Cerigo we did not visit, for reasons stated in the Ionian Islands Report.*

Considered in their relations to health, all the stations are insular, and the barracks and hospitals are close to the sea, many of them on the sea shore. Dwelling houses in similar positions at home would be considered favourably placed as regards health, and yet very few of the barracks at these stations are healthy. The inmates of some of them have suffered severely at different periods from epidemic diseases, and as a whole they yield a high sick and death rate among the troops.

The climates differ, of course, at each station, but they may be considered as occupying an intermediate position between the climates of England and those of the tropics: generally warm, at times depressing and variable, but not necessarily unhealthy to healthy people, although of such a nature as to add intensity to any local causes of unhealthiness existing at the stations. Malta has the hottest climate, and is more subject than any of the others to the depressing effects of the sirocco.

Gibraltar suffers from the east wind, which occasions physical effects similar to those of the sirocco. But the climate is a fine and healthy one, and yet the garrison has several times been subject to the ravages of yellow fever.

The Ionian Islands, from their close proximity to the mountainous districts of Albania and Greece, have all considerable variability of temperature, influenced by the direction of the winds, and they also experience the effects of the sirocco, debilitating for the time, but not distinctly productive of disease.

There is no marshy ground either at Gibraltar or Malta, and no sources of malaria of any importance, such as those from which intermittent diseases arise. It is different in the Ionian Islands, where improved agriculture and especially drainage appear to have attracted little or no attention. There everything is very much in a state of nature, and even in the immediate vicinity of the principal seat of Government at Corfu there are extensive marshes and tracts of undrained land, such as are rarely met with in the improved districts of western Europe. These act injuriously on the health of the troops; for we find that while periodic fevers are rare at Gibraltar and Malta, they are of frequent occurrence, and sometimes of fatal type, in the Ionian command.

The sanitary condition of the dwellings of the civil population at all the stations is very bad, and it has been impossible in this inquiry to separate the sanitary condition of the troops from that of the civil population. Much, of course, might be done to render barrack rooms more healthy by themselves, but where a bad, unhealthy system of town drainage is intimately connected with the barrack drainage, and where a defective town water supply is necessarily accompanied by a defective barrack water supply, there is no remedy for either evil, as regards the barracks, but to improve the drainage and water supply as a whole, and this can only be done with the concurrence of the civil authorities.

Besides this, at all the stations sanitary defects existing among the civil population place them in constant danger of outbreaks of epidemic disease. The troops are subject to the same general class of morbific causes as the rest of the population, and it may be considered certain that no epidemic can attack the civil population without endangering the health of the troops in garrison.

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* Although recent political events, which have occurred since this report was in type, have rendered any reference to the Ionian Islands stations unnecessary, so far as sanitary improvements are concerned, we have nevertheless considered it to be advisable to include the Ionian Islands, because all the experience which can be obtained in regard to local conditions affecting the health of troops is of importance, and there are some points of interest in which the conditions in these islands differ materially from those presented by the other Mediterranean stations.

At one or other of these stations both troops and people have suffered from plague, cholera, yellow fever, and from severe fevers of other forms, all connected with sufficient local causes.

In all the towns the drainage, especially the house drainage, is in a very bad condition; the domestic conveniences connected with it are of a rude and unwholesome description, or there are none; the water supply is either deficient in amount or not of good quality, and in no instance is it properly distributed for domestic purposes, or connected with the drainage. All defects of this kind which used to exist in the worst districts of unimproved English towns before the days of the Public Health Act exist as the rule in these Mediterranean towns. The dwellings of the poorer classes are of a very inferior description, badly constructed for health, overcrowded, and deficient in domestic conveniences.

In consequence of the intimate relation which exists between the health of the troops and the health of the civil population, we have deemed it to be our duty to give a general account of the sanitary condition of each garrison town, and of the diseases incident to the civil population, together with the principles required for the guidance of the local authorities in dealing with the present evils.

Little or nothing as yet has been done in the way of improvement in these matters at Gibraltar. A good beginning has been made at Malta, and the present enlightened Government has every disposition to grapple with the evils. In the Ionian Islands, although there are municipal authorities, nobody seems to care about the matter, or, at all events, except the water supply at Corfu and Zante, nothing has been yet done to improve the sanitary state of the population.

We have found much requiring improvement, both in barracks and hospitals, at all the stations; we shall give a very general sketch of existing defects, and to avoid repetition we shall lay down the principles we recommend to be kept in view in carrying out the detailed improvements advised in the reports themselves, beginning with the important subject of barrack accommodation.

1.—Space per Man in Barrack Rooms.

According to existing regulations, every man should have 600 cubic feet of barrack room space, an amount which, with barrack rooms 10 feet high, would afford 60 superficial feet per man of floor area. This regulation appears to have been framed with special reference to home stations, where there are certain conditions of climate and of barrack construction, which do not exist at foreign stations. The regulation obviously takes for granted that all the rooms to which it is applicable are otherwise fit for habitation; but there are rooms at many stations, especially abroad, to which the regulation cannot be applied, because the favourable conditions which it takes for granted do not exist.

As might be expected, the barracks at the Mediterranean stations vary greatly in local position and construction, as well as in their general sanitary relations. Some few of them occupy airy, healthy positions; they are of good construction, and admit of ventilation and other sanitary improvements. In all such cases we consider that there are no sufficient reasons arising solely out of the climate why the regulation space of 600 cubic feet per man should be much exceeded. Barracks of this favourable character are, however, merely exceptional. In the great majority of cases it would be injurious to the health of the men to adhere to the regulation, on account of the objectionable character of the barrack rooms. In several barracks the regulation space is at present exceeded from this cause.

The casemates used as barrack rooms within the line wall at Gibraltar occupy low, close, damp positions. Some of them are hotbeds of fever, and are not suitable for ordinary habitation. Others of them can only be used with safety by diminishing the number of men, so as to give from 800 to 1,000 cubic feet per man.

At Malta the casemates now affording barrack accommodation to the garrison were never built for barrack rooms. Many were intended for stores, others for places of temporary refuge for women and children in case of siege; others were used as manufactories. The military force in the time of the knights of Malta was distributed all over the islands, and the men lived with their families, except when called out for inspection, drill, or guard duty. There were few barrack rooms in the ordinary sense of the word, and yet all classes of casemates are now occupied by troops. Some of the casemates are so lofty, that if they were allotted at 600 cubic feet per man, nearly the entire floor surface would be occupied by beds, and the surface overcrowding would be excessive. This disproportion between the surface area and cubic contents exists in a large number of occupied casemates, and in these instances the question of healthy cubic space per man becomes in reality a question of superficial area. Many casemates are in positions where the external ventilation is by no means sufficient for health. Some are partially cut out of the solid rock; others are damp from infiltration of water through the soft porous stone of which they are built.

In allotting the amount of space per man, these various conditions have to be borne in mind.

In the New Pembroke Barrack, recently built on better principles in an airy sea-side position, about three miles from Valetta, 600 cubic feet per man has been given. This should be sufficient as far as space is concerned, but the surface area is too small for the climate: 600 cubic feet per man affords sufficient space in the new huts at Gibraltar, but for all the other barracks at that station other principles must guide the allotment of space. The barracks in the Ionian Islands vary in character like those at the other stations. Some of the casemates in Vido are hardly fit for human dwellings. The more recently built barracks at Corfu admit of being so improved that they can be occupied at 600 cubic feet per man. In the other islands the garrisons are so small, and the positions generally so airy, that most of the rooms fit for occupation might be allotted at 600 cubic feet per man, except in very hot or malarial positions.

Guided by these principles, we have taken each barrack by itself, and after examination on the spot, we have decided on the number of men each room might contain with reference to the local position, superficial area, and possibility of improving the rooms.

We regret to say that the older barrack rooms are, with few exceptions, much overcrowded. Even with all their disadvantages, less than 600 cubic feet per man has generally been given in these rooms; and hence, if the present strength of the garrisons is to be kept up, a considerable addition will have to be made to the barrack accommodation at all the stations.

We have shown the extent of overcrowding, both as regards space and area for each station in the detailed reports, and shall merely give here the general result.

As already stated, the home regulation is 600 cubic and about 60 superficial feet per man.

At Gibraltar the case stands thus. There is regulation space for 5,727 men. Of these, 384 men are barracked in new huts, giving 600 cubic feet per man. The remaining 5,343 have an allowance of space varying from 250 feet to somewhat over 600; but only 63 men have this larger amount. No fewer than 3,617 men have under 450 cubic feet each, and 5,253 men have less than 40 square feet each.

Taking into consideration the position and construction of the barracks at this station, we find that in barracks where the present practice in the garrison would place 5,727 men, there will be wholesome accommodation, after the rooms are improved, for no more than 3,953 men. There is hence a positive want of healthy accommodation for 1,774 men.

At Malta half the troops in the casemates have less than 600 cubic feet, and more than half have under 45 square feet per man.

One of the barracks (Strada Torre), with regulation space for 476 men, is so bad that it cannot be occupied. Deducting this barrack, making allowance for the local position of the other barracks, and the surface area which ought to be allowed in all the rooms, in consequence of their height, including also the New Pembroke Barrack in our calculation, we find the question of accommodation at Malta to stand as follows:—There is regulation space for 6,955 men; there is wholesome accommodation for 5,014 men; leaving a deficiency of room for 1,941 men.

We assume that in comparatively open positions occupied by barracks in the Ionian Islands 600 cubic feet per man ought to be sufficient for health, where the barrack rooms are otherwise fit. Applying this rule, we find at Corfu and Vido that there are 2,494 men barracked in rooms with space for 1,654 men.

At Paxo a barrack hut for 30 men is required, as the present accommodation for 28 men is not sufficiently good, and is damp.

At Santa Maura there is regulation space for 126 men where 96 men ought to be, even if the ground-floor rooms were occupied, which they never should be on account of malaria.

At Ithaca 92 men occupy rooms where 44 should be.

At Cephalonia and Luxuri the regulation number of troops has varied from 654 to 579, in barracks where there is scarcely healthy accommodation for 300 men.

Zante barracks have regulation space for 326 men, or about 100 men more than there should be.

In the Ionian islands there is thus wholesome accommodation for about 2,350 men and regulation space for 3,720, leaving deficiency of room for 1,370 men.

It would hence appear that the Mediterranean stations we examined have, either by regulation or by local practice, barrack accommodation (some of it good, much of it indifferent, and some of it unfit for occupation) for about 16,402 men. That by applying the home scale of 600 cubic feet per man wherever it is possible to do so, and by departing from it as little as possible in barracks badly situated or otherwise incapable of sufficient improvement, there is space for no more than about 11,317 men, leaving a deficiency of space for about 5,085 men.*

This large deficiency can only be met by providing more accommodation, or by reducing the garrisons.

At all the stations there is one period of the year more unhealthy than the remainder. The prevailing diseases at this season are fevers and bowel complaints.

In the absence of sufficient barrack accommodation, we would suggest, as a temporary expedient for preserving the troops from the unwholesome influence of their barrack rooms during the unhealthy months, that as many men as possible be removed out of the crowded rooms and placed under canvas. We have indicated in the reports on the stations the class of barracks in regard to which this measure might be most advantageously adopted, and we recommend that it be made a matter of ordinary barrack administration during such time as the principal medical officer of the station may certify as to its being necessary.

The experience of Pembroke barracks at Malta shows how much benefit might be derived by removing troops from unhealthy casemates if this measure is properly carried out. But the amount of disease which took place among troops under canvas in a badly selected locality close to these barracks, shows the need of exercising care in selecting ground for camping.

2.—Additional Barrack Accommodation.

If it be determined that the present garrisons are to be maintained, it will be necessary to provide additional barrack accommodation. If the sites for barracks be properly chosen, and if the buildings be suitably arranged for health, 600 to 750 cubic feet, with from 60 to 75 square feet per man, ought to afford sufficient space for health at almost every Mediterranean station. If in any locality where a new barrack is required there be not sufficient area to erect barracks of hut construction, it would be safe to build barracks containing two floors of rooms. But the simplest form of construction for barracks in warm climates, to ensure the conditions necessary for health, subdivision of men, and good ventilation, is that of detached huts.

Huts of this description have already been built at Gibraltar, where the practice of building is similar to that followed at home. The windows of these huts are, however, too small.

The Maltese population build in a different manner. They have a soft workable stone, which affords great facilities for erecting structures, sometimes arched over to form casemates, or having arched ribs to support ceilings or roofs, or wooden beams are used. The roofs are flat, and stone flooring is universally adopted, to prevent annoyance from vermin.

The barracks in the Ionian Islands are built like ordinary English structures.

Detached barracks can be built at any of the stations, either on one floor or two floors, and can be rendered healthy by attention to the following simple precautions:—

1. The hut may consist of one room for 20 to 25 men, with windows along both sides, and doors at the ends. The window space should be in the proportion of one window to two beds. The beds should be arranged between the windows, with their heads to the wall. The windows should be carried from within about 2 feet 6 inches of the floor to within 1 foot 6 inches of the ceiling, and should open top and bottom. From 20 to 22 feet would be a good breadth for the room. Nine to ten feet would be a sufficient height.

2. In airy positions each man should have at the least 600 cubic feet, and 60 square feet of barrack-room space. This applies to detached hut construction, where the air plays freely round all sides of the hut. But, if rooms be built with two sides only exposed to the outer air, the cubic space and superficial area should be 750 and from 70 to 75 feet respectively.

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* Excluding the Ionian Islands, the barrack accommodation at Gibraltar, Malta, and Gozo would, if improved, be sufficient for 8,967 men, leaving a deficiency to be supplied of healthy barrack-room space for 3,715 men of the present garrisons.

3. Each hut should be ceiled so as to interpose an air space between the ceiling and roof for coolness. If the hut lies east and west, a verandah should be provided on the southern side. If the hut lies north and south, it would be desirable to construct a verandah on both sides, but care must be taken not to obstruct the light too much. A verandah is a great comfort also in wet weather. It should not be less than 6 or 7 feet wide.

4. A non-commissioned officer's room should be placed at the end of every hut, or two huts might be built in line with two non-commissioned officers' rooms between them. These rooms should have 190 to 200 or more superficial feet of floor surface, according to the local position of the barrack.

5. The night urinal may be placed in a porch on the other side of the verandah, opposite the end of the room, in order to be completely cut off from the room, although reached under cover.

6. There should be large-sized louvred ventilators introduced along the opposite sides of the room, between the windows and close under the eaves. A row of ventilating air bricks, carried all round in the same position, would be preferable in situations not exposed to very high winds.

7. Where rooms are ceiled with flat ceilings, louvred ventilating turrets should be placed at intervals, leading from the ceiling of the room to above the ridge, for the purpose of carrying off the foul air. Where the ceiling is carried in the line of the rafters, exit for foul air may be provided by means of a raised ridge. Where there are two floors of rooms ventilating shafts would have to be carried from the ceiling of the lower room to above the roof.

The fresh air inlets would be of the same nature as in single floor huts.

8. The foundation of a hut should never be dug out of the ground so as to leave a hollow space under the floor. But, on the contrary, the floors should be raised three or four feet at least above the ordinary ground level, with a free passage for air beneath.

Space for a hut should never in these climates be obtained by cutting away part of a hill side, leaving a section of earth or rock at no great distance from the side or end of the building. But if this be unavoidable, a clear space of at least 20 feet should be left between the hut and the hill side. The plateau obtained by cutting and levelling should be efficiently drained, so that all the water from the higher ground may be cut off and turned aside from the site of the hut.

All hut sites should be entirely isolated, so that no surface water can find its way under the hut. Wherever practicable, the end and not the side of the hut should face the slope, in order to have the outer ventilation as free as possible, and to interfere as little as may be with the natural fall of the drainage.

9. All barrack buildings in warm climates should be placed so that healthy winds may blow against their sides, rather than against their ends.

By keeping these principles in view, and by selecting ground with a healthy exposure and a good natural fall for drainage, there would be no difficulty in constructing healthy barracks at any of the stations. In such a situation as Sta. Maura fort, where no selection of ground can be made, because it is all too low, the only way is to build the huts in two floors, and to occupy only the upper floor for sleeping rooms.

We have had plans prepared to illustrate different methods of embodying these principles of barrack construction applicable to the Mediterranean stations.

Plan No. 1 shows a plan, section, and elevations of a single barrack hut for 24 men. The floor is raised above the ground with a free passage of air beneath it. The room is 73 feet long by 22 feet wide and 11 feet 6 inches high, affording about 760 cubic feet, and 67 square feet per man. There are 12 windows, 6 on each side, with two beds to each window. The room is ceiled and the walls are built double for coolness and dryness, and they are further protected by a verandah 7 feet wide. Ventilation is provided for by louvred foul air shafts carried up at each end of the room to above the roof, and fresh air is admitted by a continuous course of ventilating brick carried along the opposite sides of the room under the eaves.

At one end of the hut is a serjeant's room 16 feet long by 14 feet broad and 11 feet 6 inches high. This room has a separate entrance door and a small inspection window into the barrack room.

At the opposite end of the barrack room there is a lavatory room, a small room with foot pans, and a compartment to contain the night urinal. These although under the same roof are separated from the men's room by a through and through open passage 6 feet wide, out of which opens the barrack room door. There is no fire-place in the barrack room, as the plan is intended for warm localities, much exposed to the sun. There is a fire-place in the serjeant's room for cooking, if he happens to be a married man.

Plan No. II. shows a double barrack hut intended for a detachment barrack for 32 men at Cerigo.

As in the preceding example the floors are raised above the ground with a free passage of air beneath. Each room is 62 feet long by 20 feet broad and 12 feet high, giving about 78 square feet and 930 cubic feet per man. There is a window for every two beds. The roof is flat, a verandah is carried out straight from the roof. The serjeants' rooms in this example are placed between the barrack rooms. The ablution and night urinal accommodation is at the outer end of each barrack room, and is cut off from the rooms by a through and through passage. It is differently arranged and admits of freer ventilation than that shown in Plan I. In this plan a night water-closet is shown.

The ventilation of the barrack room is provided for by foul air shafts at the ends, and a continuous ventilating course at the eaves.

The station is a very hot and exposed one, and no fire-places are required.

Plan III. shows a barrack in two floors, intended for situations where the available ground would not be sufficient to enable single huts to be built. There are two barrack rooms and two serjeants' rooms on each floor, together with the staircase and passages. Each barrack room is 63 feet long, 20 feet wide, and 11 feet high. It is intended for 18 men at 70 square feet and 750 cubic feet per man. The rooms are ventilated by foul air shafts and a continuous course of ventilating air bricks at the eaves, as in the preceding examples, and they are all provided with ventilating fire-grates, to admit warm fresh air during damp weather. There are verandahs along one side. The ablution accommodation and night urinals are placed at the outer ends, and are reached by passing from the room into a through and through passage having a constant sweep of air passing across it. This arrangement of ablution accommodation would only be necessary in very exposed positions. In all others it might be reached by means of the verandahs, without making use of the door at the end of the barrack room.

There should be no glass in the windows of the stairs and passages. They should always be open to allow the air to sweep freely through the building.

Ventilating fire-grates are required at some barracks in the Mediterranean stations, to warm and dry the air at certain times during the wet season. Where coal is burned, the ventilating grate in use in English barracks (Plan X. Fig. 1) should be adopted. Where wood is used, the form of grate shown in Plan IV. is necessary. It is an open fire-place, the back of which is formed of a double chamber of fire-clay blocks. The wood is burned against the front of this chamber so as to heat it, and the fresh air from without traverses the chamber twice before entering the flue through which it is admitted to the room.

3.—Married Soldiers' Quarters.

Except a few Royal Artillery and Royal Engineer huts at Gibraltar, there are no proper quarters for married soldiers at any of the stations. The present accommodation is everywhere of an inferior and bad description. It consists of misappropriated rooms of all kinds, miserable ruinous wooden huts, arches in fortified works, and other similar makeshift places, generally of a character inferior to the dwellings of the lower class of civil population in the vicinity.

It is a matter of urgent necessity that the present deficiency should be supplied by erecting proper married quarters.

We would propose that sites should be selected on similar principles to those for barracks, that the foundations should be similarly prepared, and the lower floors raised above the ground in the same way. One room has been fixed as the allowance for every married soldier, and until all barracks are supplied to this extent the allowance of space should be adhered to. But in making this provision there might advantageously be a few additional rooms, in order to afford a second room in cases of men with large families.

The same rules of healthy construction for this class of buildings are required for the Mediterranean stations as for dwellings of the labouring classes at home. The following are the principles to be kept in view:—

1. Simplicity of construction and arrangement in the block plan, so as to ensure free outer ventilation. This primary condition can be ensured in erecting married quarters in blocks, whether in one, two, or three stories.

2. Each room should have a door and window to the outer air on one side, and a window to the outer air on the side opposite the door. For serjeant-majors' quarters, for which two rooms are allowed, there should be a door and window from the outer air into one of the rooms, a door through this room wall into the other room, which room should have a window to the outer air on the side opposite the outer entrance

door. That is, whether a quarter consists of one or two rooms, there should be doors and windows to the outer air on opposite sides of the building, so that by opening the doors and windows a free current of air can be passed right across the building.

This cardinal principle of construction should never be lost sight of in erecting dwellings for soldiers and for persons of the soldiers' class. It is impossible to afford sufficient cubic space for the adults, and often numerous children of poor men's families, so as to have a residue of air sufficient for health within the rooms. And simple structure, with every natural facility which the architect can give for renewing the air, is the only other alternative. Indeed, we consider it to be a form of construction equally essential for officers' quarters.

3. This principle precludes altogether the arrangement of separate houses on opposite sides of an inner passage or corridor. To apply the principle in its utmost simplicity, single lines of rooms on one floor should be erected. Where blocks of dwellings on more floors than one are required, access to each dwelling should be given separately from an outer terrace, six or seven feet wide at the least, reached by stairs at the ends.

4. Inner stairs should always be avoided in crowded houses, unless the stairs and passages go through and through the building, with windows and doors on both sides. The outside terraced entrance and verandah, as they are used in this class of dwellings at York and Woolwich, are the best arrangements yet made for ensuring the advantages of healthy structure for quarters for married soldiers, and indeed for dwellings for the working classes generally.

5. This primary rule for securing fresh air inside the rooms requires that everything which is likely to foul the air, should be kept out of the house. There should be neither sinks nor water-closets under the same roof with living and sleeping rooms, and having ventilation common with that of the house.

In houses of a higher class, these things can be otherwise arranged, because different habits in the occupants lead them to exercise due care over them, but among soldiers' wives, and generally among women of the poorer classes, no dependence can be placed on the proper usage of any domestic contrivance, however good, in such a way as to prevent mischief. The only safety is to place all water-closets, sinks, lavatories, baths, wash-houses, and cook-houses, out of the buildings, and under a separate roof, connected, if thought desirable, under cover with the dwellings, but having quite separate ventilation.

6. Each single quarter should have 180 to 200 superficial feet of floor area, and double quarters 300 to 350 superficial feet.

Plan V. embodies these principles of construction in a block of building intended for 21 married soldiers in Mediterranean climates. It consists of two floors of single rooms, each of which is 16 feet long by 13 feet 6 inches wide, having a door and window on one side and a window on the opposite side. Both floors have outside stairs, terraces, and verandahs, and the lower floors are raised above the ground with a free current of air below. Each room has a foul air shaft and a row of ventilating bricks close to the ceiling on both sides. In married quarters of this construction there should be double outer walls to keep the rooms cool in summer and warm in winter.

At the larger Mediterranean stations the barracks are scattered over so much ground that the married quarters must be at considerable distances from each other, and instead of building a female hospital it would be better to provide a room attached to each block, into which confinements and cases of sickness might be received for treatment by the regimental surgeon. Such a room, 26 feet long and 16 feet wide, is shown in the plan. There is a small kitchen, or scullery, with a fire-place for heating articles, and a room for the nurse or woman in charge.

Plan VI. shows another form of construction for married quarters in separate huts. It was intended for the small detachment barrack at Cerigo, but is equally applicable to large barracks in climates where detached huts are more healthy than large blocks of building. On the same plan is shown a small guard room and cells with arrangements suitable for Mediterranean climates.

7. A married soldiers' ventilating fire-grate of the approved pattern, Plan VII., should be put up in each quarter.

8. Each room should have ventilating air bricks along opposite sides, as shown in the plans, or in exposed situations a louvred inlet ventilator should be introduced at the eaves, and a foul air shaft should be carried up in the wall, as shown in the plans.

9. The windows should open top and bottom, and should be carried from about 2 feet 6 inches from the floor to within a foot or 18 inches of the ceiling. Verandahs six or seven feet wide are required on the sunny side at all the Mediterranean stations.

10. As it is not possible, in summer, for the families to cook in their own living rooms, each block of quarters should have a cook-house, with a raised brick platform to hold a

small iron, earthenware, or Maltese stone cooking stove, either of which would be quite sufficient for all ordinary purposes, while they possess the advantage of enabling each family to cook with its own fire. This arrangement is shown on Plan V. The water-supply and sink for cooking and washing up should be in the cook-house.

11. Each block should have an ablution and bath room for women and children, and a similar room for men, as in Plan VIII. Two baths and a few fixed wash-hand basins with water laid on would be sufficient for every block of quarters.

12. A Jennings' latrine for women and another for men should be provided. They may be placed adjacent to the ablution rooms in the manner shown on Plan VIII.

13. Each block would require a wash-house for soldiers' washing, with coppers for boiling, fixed tubs, to which cold water should be laid on, and an ironing stove and tables, but drying apparatus would rarely be necessary in these climates. This point should, however, be determined with reference to local circumstances. The washing arrangements are shown on Plan IX. When a drying closet is required the pattern made for the War Department by Messrs Jeakes should be adopted; it is more economical of fuel than any hitherto constructed.

4.—Means of Instruction and Recreation.

The means of employing the soldier's unoccupied time are generally insufficient at the Mediterranean stations, although there are one or two establishments well worthy of imitation elsewhere.

Gibraltar has an excellent soldiers' home, with branches, to which the soldier has access when out of barracks; and at Corfu there is a covered gymnasium, also an excellent provision of its kind.

There are a few ball courts and skittle grounds, and the usual soldiers' libraries and reading rooms; but nowhere except at Gibraltar did we find any systematic provision made for affording rational recreation for the soldier. The Mediterranean stations generally, are no worse off in this particular than home stations are. All of them require additional ball courts and skittle grounds, together with gymnasia, and barrack reading, day, and recreation rooms, provided with means of obtaining refreshments, and playing innocent games. But, although the provision of this class of barrack accommodation is no worse, the necessities for it are much greater than at home. The casemates where the soldiers live are not places in which men would choose to spend their spare time. They are by no means sufficiently comfortable, and are not to be compared to good barrack rooms. Almost every barrack should have separate recreation rooms, comfortably constructed and furnished, and very well lighted at night and warmed in winter. At present the soldier, except at Gibraltar, has no resource between a dark casemated room and immoral places of resort, which abound in these garrisons, and which are injurious both to his health and efficiency.

These improvements should be carried out in conformity with the recommendations of the Report drawn up by the Committee on Soldiers' Libraries and Recreation rooms.

Every barrack should be supplied with two rooms, one room for newspapers and books, and for writing letters, the other for smoking, talking, playing games, &c. In connexion with this there should be a small room or bar for the preparation and sale of tea, coffee, ginger beer, bread and butter, &c. A room or quarter for a person to superintend should also be provided.

The rooms should be of sufficient size to allow at least for 25 per cent. of the soldiers in the barracks in which they are situated to occupy them at one time, and 12 superficial feet per man, with a height of from 11 to 14 feet, dependent upon their length. They should have a ventilating grate, regulation pattern of the large size, to every 20,000 cubic feet of space, for which an allowance of coal for about two months in the winter should be issued. The windows should be on opposite sides of the room, carried to within 1 foot or 1 foot 6 inches of the ceiling, and down to within 3 feet from the floor, and at distances of 6 or 8 feet. Inlets for the admission of fresh air, of the regulation louvred pattern, should be placed close to the ceiling in every space between the windows, and shafts for the removal of vitiated air or smoke should be carried up in the walls or through the ceiling to above the roof; the lower part being louvred to prevent any down-draught being felt by the men, and the upper part protected by louvres or otherwise against the possibility of rain passing down. These shafts should have an area of not less than one square inch for every 25 cubic feet of the room, and they should be provided with a valve to reduce the opening by two-thirds in cold weather.

The rooms should be furnished with comfortable benches with sloped backs, settles, arm-chairs, and solid tables; and ample means of lighting them at night should be provided.

Gymnasia should likewise be provided for instructional drill in gymnastics.

The only way to make gymnasia really useful is to build them of a proper size, in sufficient numbers, in convenient localities for the regiments, and having done this to make carefully conducted gymnastic exercises, conducted, we mean, on sound physiological principles, as all drills and exercises ought to be, a special parade.

5.—Ventilation of Barracks.

Many barracks in the Mediterranean commands are unfavourably situated for external ventilation. Those within the Line wall at Gibraltar are examples of this defect. Although close to the sea, the rooms face towards narrow closed courts, or spaces between the barracks and the houses of the civil population, while their opposite ends abut against the sea wall. Many of the Malta barracks are similarly constructed: others of them are closely surrounded by houses and buildings cutting off the sea breeze. The large Corfu barracks have the ventilation of one entire side interrupted by the rock against which they are built.

The structure of all the older class of barracks throughout the commands is unfavourable to ventilation. Nearly all are deficient in window space. In barrack rooms, ablution rooms, latrines, cook-houses, in fact, in all buildings, there seems to have been an aversion in the designer to give air and light. In some rooms there are no means either of light or ventilation, except doors and loopholes. In the casemated barracks generally there are windows and doors only at one end. Sometimes the distance between opposite doors and windows, where there are windows on both sides, is too great to admit of free renewal of the air. Sometimes the entire range of casemates communicates by doors through the arches, leading to a community of foul air throughout the structure.

In the great majority of rooms no special means of ventilation have been provided.

In a few barracks foul air shafts have been lately introduced, generally too small and without inlets for fresh air; in a few rooms there are shafts with inlets for fresh air, the latter recently supplied. In some instances there are openings near the ceilings, but no foul air shafts. In only two instances, namely, in the Pembroke Barracks, Malta, and in the new huts at Gibraltar, has a suitable provision for ventilation been made in the construction, and in the latter the window space is too small.

Taken as a whole, the Mediterranean barracks require ventilating arrangements even more than was the case formerly with barracks at home.

In dealing with this important subject, it is necessary to bear in mind that good ventilation in warm climates does not mean simply the passage of a certain amount of air per man through the rooms, as is the case at home stations (where 1,200 cubic feet of air per man per hour are provided), and further, that except in special cases, the question of ventilation is not complicated as it is at home, by reason of the question of warmth being so closely connected with it.

The absence of fire-places must also be taken into account in introducing ventilating arrangements, and larger ventilating shafts must be provided to supply the want of a heated chimney flue.

The element of high temperature everywhere gives greater activity to any local causes of unhealthiness, and amongst the most important of these causes at the Mediterranean stations must be ranked the exhalations from the breath and bodies of men crowded together into barrack rooms. If an atmosphere charged with these emanations is allowed to remain stagnant in such climates, sickness may at any time ensue, even although a certain measured amount of air be introduced at one end of a room, and be drawn off at the opposite end.

In all ventilating arrangements for use in warm climates, provision should be made for constant movement of the air through every corner of the barrack room. But in barracks placed in close situations, and constructed in the defective manner we have described, this is difficult to accomplish.

The principles we recommend to be followed in this matter are:—

1. To remove, wherever practicable, any external obstruction to the circulation of the air, such as useless buildings or old walls, so as to secure as free a movement of air as possible round the barrack.

2. To ventilate each barrack room by itself and independently of every other room, and in applying this principle to close up all communications between adjacent barrack rooms.

3. To enlarge all windows having an area too small in comparison to the cubic contents of the barrack room; to open new windows in dark corners, in gable ends, or

under the crowns of arches near the tops of casemates, and to increase the window space where practicable by providing windows on opposite sides of the rooms; to enlarge loopholes into small windows, and to provide them with loop-holed iron shutters to be closed in case of need. The barrack room window space, including the additions made to it, should equal one square foot for every 50 to 55 cubic feet of contents of the room.

The carrying out of these alterations will of course be subject to considerations of defence. But wherever they can be made they will improve the healthiness of the rooms.

4. In casemated barracks, more especially in those at Malta, to study carefully the directions of air currents outside the rooms, and to make the inlets for fresh air in such positions as to take advantage of these currents. Such inlets should be generally of the dimensions hereafter stated.

5. In addition to fresh air inlets, to introduce shafts of the dimensions hereafter stated, for removing foul air from the top of the room. In casemates these shafts would have to be carried up in the most convenient positions afforded by the structure of the works.

6. The shafts should all be louvred above and the louvres protected to prevent rain beating in, and also below, to throw any chance down currents of air towards the ceiling. There should be a valve at the lower end, held in its place by a cord, so as to be allowed to fall open for cleansing the shaft. The method of louvring is shown in Plan X., Fig. 2. In the report on Malta we have recommended Muir's four-sided louvred ventilator as being most suitable for the peculiarities of the climate and the local position of many of the casemates. This ventilator should also be louvred at the lower end. If soldiers feel down drafts they will infallibly stop up the openings from whence they come.

The best inlet for fresh air in existing barrack rooms is a grating of large size with a louvre into the room, having the blades so arranged as to throw the inflowing air up towards the ceiling, and capable of having half its sectional area closed in cool weather, as shown in Plan X., Fig. 2. For new barrack rooms in close warm positions, the best inlet is the continuous ventilating course at the eaves already described.

7. The most desirable places for foul air shafts and inlets for casemated rooms depends on the nature of the casemates.

In long casemates with windows and doors at opposite ends, the best place for the shafts is about the middle of the length of the casemate, and in such cases the inlets for fresh air should be placed at each end over the doors and under the crown of the arch. This arrangement is shown in Figs. 1 and 2, Plan XI.

In casemates with one of their ends against a dead wall, the shafts should be carried up from the crown of the arch close to this wall, and the inlet should be placed at the opposite end over the door, under the crown of the arch, in the manner shown in Fig. 3, Plan XI.

Where there are two floors of casemates so constructed that separate ventilating shafts cannot be made for each floor, the lower floor may be ventilated by carrying a short shaft from the crown of the arch into one of the loopholes of the casemate above. If this loophole were glazed with thick glass on its inner side it would still admit light to the upper casemate, although acting as a ventilating shaft to the casemate below. The arrangement is shown in Plan XI., Fig. 4.

In large casemates in very confined positions more than one shaft may be required.

Where the men's accommodation consists of barrack rooms of the usual construction in floors, the shafts should be carried up in the most convenient positions beside the division walls, and the inlets should be placed in the opposite sides of the room, over the windows, or as high up as possible between them.

In the upper floors of existing barracks and in existing barrack huts, when the ceiling follows the line of the rafters, the best ventilation is afforded by a louvre carried along the ridge, with inlets on opposite sides under the eaves. But where there is a flat ceiling, a louvred turret and shaft of the construction shown in Plan X., fig. 2 should be introduced, together with opposite fresh air inlets.

8. For the Mediterranean stations the dimensions of shafts and inlets should be *at the least* as follows, subject to such increase of dimensions as the local position of the barracks may appear to indicate as necessary.

(*a*) For all casemated barracks on a single floor the sectional area of the foul air shaft or shafts if there be more than one, should be equal to one square inch for every 25 cubic feet (at Malta for every 20 cubic feet) of contents of the room. The aggregate area of the fresh air inlets should be one square inch for every 30 cubic feet of contents of the room.

(*b*) For all upper rooms of casemates or of ordinary barracks, where the accommodation consists of more floors than one, the sectional areas of shafts and inlets should bear the same proportion to the cubic contents, namely, one square inch to 25 cubic feet for shafts and one square inch to 30 cubic feet for inlets.

(*c*) The dimensions of shafts and inlets for rooms in the floors below the upper floor should be for shafts, one square inch to 30 cubic feet of cubic contents, and for inlets one square inch to 30 cubic feet of contents.

The sectional areas of all existing shafts and inlets should be enlarged to these dimensions.

9. It will increase the efficiency of all ventilating shafts, both of those which already exist, and of those to be introduced, if they be carried as far as they conveniently can be above the roof of the building or casemate. Ten or twelve feet above the roof would be a desirable length for each shaft.

In the reports for each station we have endeavoured to state how the ventilation should be carried out, but the problem is so difficult on account of the various positions and constructions of the barracks that all we can do is to lay down general principles to be applied in each case according to circumstances. We are of opinion that very nearly all the barrack rooms which are otherwise fit for habitation can be sufficiently ventilated if due care be taken; but to ensure satisfactory ventilation it will be necessary to watch the results obtained in each case, and to make additional fresh air openings in favourable positions if necessary, until the air is found to be sufficiently pure by night as well as by day.

By the new Medical Regulations, medical officers are charged with the duty of reporting on this subject.

6.—Warming of Barrack Rooms.

Warming is rarely required for barracks at the Mediterranean stations. Practically it would not be necessary to provide for this contingency, but fire-places are required for dryness during the rainy season in casemated barracks situated in low, damp localities. Some casemates, especially those along the line wall at Gibraltar, are nearly as damp in the rainy season as underground cellars are at home, and stand in urgent need of proper fire-places with ventilating fire grates to be used during the wettest months.

Where coal is used, the ordinary ventilating grate in use in English barracks, Plan X., Fig. 1, should be adopted for existing barracks. Where the fuel is wood, a modification of the ordinary warm air grate suitable for burning wood, shown on Plan IV., already described as applicable to new barrack rooms, should be adopted.

7.—Drainage.

A bad state of the drainage is one of the principal defects at all the stations. This is partly due to the absence of sewerage altogether, partly to defective construction of the drains; to the want of a water supply in combination with the sewers, and partly to the condition of the drainage outlets. In almost every instance, except where barracks are removed from the civil population, the drainage defects are common to the towns and barracks. This fact renders it much more difficult to remedy the evils in the barracks than would otherwise be the case. All that can be done at present in most instances is to make the drainage within the barrack boundary as complete as possible, and to look for further improvements in the general system, to the co-operation of the civil authorities.

At Gibraltar, considerable drainage works have been carried out since the last epidemic yellow fever of 1828, but the sewers of the higher parts of the town have very steep inclines, and lead into sewers in the lower districts, where there is very little fall, and as no system of water supply has yet been provided in connexion with the drainage, the mains in the lower levels are liable to become obstructed by deposit during the long dry season, and the first heavy rain bursts the sewers, sometimes washing out their contents close to the barracks in the lower levels. There is besides no proper system of house drainage connected with a water supply. All filth is thrown down these sewers, where they exist, and left to ferment and generate foul air among the houses until the drains are washed out in the rainy season. At Gibraltar the outlets open on a shallow tidal beach, and create great nuisance.

Before we went to Gibraltar, it had been proposed to remedy the liability to bursting of the drains by constructing a catch-water main drain, for intercepting all the sewage from the higher part of the town, and for conveying it into deep water at the Ragged Staff. This intercepting sewer, with improved outlets for the sewers in the lower flat part of the town, will remedy the chief constructive defects of the present system, but after all is done, the condition of the house drainage, and the absence of a water supply, will keep the sewers in an unwholesome condition until these defects are remedied in the manner we have pointed out in the report. This subject is of great importance, as there is a large body of troops barracked in casemates at the lowest levels in the town, besides those in the barracks situated among the houses, and these latter are exposed to the influence of bad drainage equally with the civil population.

At Malta the town drains are of a most disproportionate size to the amount of water they have to remove. They are defective in form and material, and most of the outlets are offensive. Some of the worst of them open into the tideless harbour close to the general hospital and to barracks, creating nuisance in the vicinity.

The barrack drains about which we have been able to obtain information are very much too large for any possible amount of water they are likely to receive. Deposits are formed in them in consequence, and much nuisance arises in dry weather. All the Maltese drains are made of very porous sandstone, which absorbs water rapidly. Some drains are as much as ten feet deep by two feet wide, in cases where a nine-inch pipe would in all probability carry away the entire barrack drainage and rainfall with ease.

There is no connexion at present between the water supply and drainage in this garrison, and the house drainage is nearly in as bad a condition as it is at Gibraltar.

There is no drainage at Corfu worthy of the name, except that immediately connected with the barracks. The town drains are mischievous to health, and the principal outlets are in shallow water, causing great nuisance and also sickness in one of the barracks. Very few of the houses are drained, and cesspool matter lies on the surface gutters of the streets. The chief defect, so far as the Corfu barracks are concerned, is in the outlets, which are not carried out into deep enough water.

The drainage in all the other Ionian towns where there are troops, is in a similar condition.

The barrack drainage at the stations is very defective, but it is better in Corfu barracks than at other Ionian Island stations, because several of the buildings in Corfu are of recent construction, and more attention has been paid to this detail.

The following are the general principles which should be adopted in dealing with this important matter:—

1. It is indispensably necessary that water supply and drainage should be connected as parts of one system. Without this, any form of covered drain is nothing but a cesspit, and it would be better for the public health that there should be no underground drains, unless there is sufficient water laid on to keep them free of deposit.

This rule applies to all barracks, hospitals, towns, and dwelling-houses at these stations.

To enable this much required improvement to be carried out at Gibraltar, a water supply must be provided for the town dwelling-houses, in the way we have pointed out in the report. Every barrack and the hospital must also have water laid on at pressure from a tank or main, for all purposes, and all the waste water must be discharged into the barrack drains to keep them clear.

At Malta, where there is an aqueduct water supply besides extensive tankage, water must be laid on for all purposes in barracks, and for household purposes.

The water supply for barracks is already connected with the drainage at Corfu. At Zante it is not. At Vido, Paxo, Santa Maura, Ithaca, and Cephalonia the water supply is deficient, not distributed as it should be, and it is not connected with the drainage.

For Zante Town barracks water should be laid on so as to cleanse the sewers; at Zante Castle barracks, and at all the other stations, water requires to be raised and tanked at a sufficient elevation to admit of easy distribution in connexion with the drainage.

2. In every instance where the barrack drainage is not well known it should be examined, described, and entered on a plan. A similar requirement is necessary for house and street drains.

3. Improved dimensions and forms of sewers and drains should be introduced where no drainage at present exists; existing sewers should be re-laid by degrees on the same improved principles. The best form of street sewer is that like the section of an egg with the small end downwards. For barrack or tenement drainage there are few cases, if any, where a nine-inch pipe would not convey all the sewage to the mains.

Wherever pipe drains are used, they should be laid in very carefully prepared solid beds, to prevent bending in any part of the line, which would make the drain worse than useless; and the joints should be made water-tight. All drain pipes should be laid in straight lines, a method which enables them to be easily examined by manholes placed at the angles of junction, and obstructions to be removed. Recently pipes have been made so as to admit of being opened for removing obstructions without destroying the pipe.

4. All the Mediterranean stations have sewer outlets to the sea. These outlets are all defective at present, and give rise to nuisance, partly because the outlets are not constructed on good principles, and are destroyed by the sea, partly because they open into shallow water close to the shore.

The best way to remedy this defect would be to complete the outlet by an iron pipe carried out far enough to enable the sewage to be diluted in a sufficient body of water, and to terminate the outlet by a drop, or by a T head, with its mouths turned away from the direction in which the force of the waves comes, in order to prevent the waves from injuring the outlet, and their impetus forcing foul air up the sewers inside the town.

5. All main sewers and drains should be ventilated by tubes carried up from the summit level to above the top of the houses. A perforated box of charcoal placed over the opening of the tube and protected from wet would destroy much of the noxious matter in the sewer gases before they escaped into the air.

6. All gully grates in streets, courts, and barrack squares should be carefully constructed and trapped. Where water traps are used, it is necessary to supply them with water during the dry season, otherwise the traps will cease to exist, and the sewer gases will be poured into streets, courts, and barrack yards.

7. Sewers and drains, if properly constructed, of sizes adjusted to the levels and to the quantity of water they have to convey, should require no flushing. But unless these conditions be attended to, the main lines should have the means of being flushed out occasionally by a head of water. At the Mediterranean stations this precaution would be most required during the dry season.

8.—Water Supply.

At Gibraltar the water supply for troops and for the civil population is obtained from rain-water tanks and from wells either within the fortress or on the Neutral Ground.

At Malta all the barracks have rain-water tanks, as also the houses of the civil population. There are besides these sources, two aqueducts ; one of considerable importance which conducts spring water a distance of eight miles to supply Valetta. The other is a much smaller conduit which conveys a small quantity of water to the towns on the Cotonera side of the great harbour.

These aqueducts supply fountains, gardens, &c., and also the rain-water tanks when the rain-water supply begins to fail.

The town and barracks at Corfu have a supply brought by pipes from the country, and laid on for several purposes. The barracks at Vido and those in all the other Ionian islands are dependent on wells and rain-water tanks. The town of Zante has a pipe supply, but it is not laid on to the barracks.

So far as amount is concerned, the Corfu barracks are the best supplied, and those at Gibraltar are the worst. Indeed this garrison is always on a small water allowance, as if it were in a state of siege.

The supply at Malta is apparently sufficient for every purpose were it properly distributed.

The general quality of the water as shown by chemical examination at Gibraltar and Corfu is inferior or bad. The well water at Gibraltar is unfit for domestic use, on account of the wells being polluted by infiltrations from the foul subsoil, charged with sewage and cesspool matter, on which the town is built. The tank water is tolerably good if care be taken to prevent impurities entering the tanks, and if they be cleansed annually. But all tanks require filters of the kind we shall presently describe, to free the water from impurity before it enters the tank.

The only approach to a good system of distribution of water to barracks is at Corfu. At every other station the method of distribution is most objectionable. The water is raised from wells or tanks by hand labour with ropes and buckets, and carried to the place where it has to be consumed. The cost of this process at Gibraltar is equivalent to a water rate of 3,000*l.* a year chargeable on a civil town population of less than 14,000, and to a rate of 500*l.* a year charged on the troops.

At none of the barracks in Gibraltar, Malta, or the Ionian Islands, except at Corfu, is water laid on for any purpose. All has to be carried by hand labour, for drinking, cooking, cleansing, ablution, and washing of linen, and this in a climate where the greatest inducements and facilities should be held out for the exercise of cleanliness and temperate habits.

The present condition of the water supply is a chief defect at all the barracks with very few exceptions.

In the fortresses it is necessary to have tanks for use during siege ; but it is possible to incorporate the use of tanks with a good system of water distribution. The tankage at Malta including recent additions would be about sufficient for a siege supply, but, taking into account the present manner of distribution, it is not sufficient for every-day purposes. The aqueduct supply if added to this would, however, be sufficient if the distributing apparatus were improved. What is chiefly wanted for the barracks and hospitals at Malta is that water be constantly laid on by means of pipes to ablution rooms, baths, cook-houses, women's wash-houses, &c., and also to drinking fountains, from distributing reservoirs to be supplied from the aqueduct, or from iron cisterns at a sufficient elevation, to be filled from the rain-water tanks by force pumps.

Drinking fountains supplied with pure, cold, filtered water are an absolute necessity at all barracks. Any tank for the supply of drinking water to fountains should be protected from heat.

In the Malta report we have stated generally the principles on which we consider that the aqueduct water could be redistributed with most advantage both for the civil population and for troops.

The water supply at Corfu, although sufficient in amount is so inferior in quality that it is necessary to seek for some purer source as near as possible to the commencement of the present aqueduct. The springs now used are really mineral waters, containing a considerable quantity of plaster of Paris in solution, derived apparently from beds of this substance in the subsoil from which the water comes.

At all the smaller Ionian Island stations, raised tanks supplied by force pumps are required, to enable the water to be properly distributed for use. At Ithaca an abundant supply of water might be obtained by an arrangement with the local authorities, from the source described in the report. At Cephalonia it is possible that a better supply than the present rain-water tanks afford, might be obtained from the high ground behind the barracks. At Zante, the town water requires to be laid on for use. At the smaller Ionian Island stations a considerable annual outlay has to be incurred by the commissariat in carting or carrying water to the different barracks on account of impure quality or deficient amount of the present supply.

The most difficult question as regards water supply is that of Gibraltar, because the source is limited by the extent of the ground. We had samples of water from all available sources analyzed, and all were inferior in purity to the tank water derived from rainfall.

Two large tanks for collecting the surface rainfall were being constructed at the time of our visit, one close to the Moorish Castle, the other between the town and the south end of the rock. A proposal had been under consideration for making use of a wide, deep, natural gulley at Buena Vista as the site of a large storage reservoir.

After mature consideration we determined to recommend that this work should be executed, and we have proposed to supply the reservoir by catch-watering the higher part of the rock and conducting as much as possible of the rainfall to the reservoir, whence it might be laid on to nearly every house and barrack on the rock by gravitation.

But the surface area from which it would be possible to collect water in this way is limited, and it is very doubtful whether the amount of water collected would be sufficient for all purposes, military and civil, even with the addition of the supply which would be afforded by the other two tanks already mentioned, and by the existing tanks of houses and barracks. We have therefore recommended a brackish or salt-water supply for flushing sewers and for house water-closets and latrines. By this arrangement the house drains and latrines will be kept clean, and the sewers will be easily flushed out in summer when necessary.

We have also recommended salt or brackish water for some barrack latrines in Malta, where fresh water may not be procurable in sufficient quantity. In using salt water, it must be kept in view that it decomposes very rapidly when in contact with organic matter at a certain temperature, and that there will be nuisance unless the latrines are discharged with due frequency.

We propose that all improvements in the water supply should be made in concert with the local authorities at the different stations, the War Office bearing its proportion of the cost for the troops. Wherever new works are required, whether of supply or of distribution, they are equally necessary for the military and for the civil population. The defects at present bear equally on all parties, and no work of a general nature is required for the garrisons, which would not confer equal and perhaps greater benefits on the inhabitants.

The question of water supply may be summed up as follows:—

1. At Gibraltar there is great deficiency of water for troops and people. The present method of supply and distribution is rude, inefficient, costly, and the quality inferior, or

bad. The rainfall on the rock affords the best future source of supply, and it should be collected in reservoirs, and distributed for use. But salt or brackish water is required for drainage purposes, because a sufficient amount of fresh water cannot be obtained. The cost to be jointly borne by the civil population and by the War Office.

2. At Malta the quantity of water is sufficient, but the aqueduct supply requires to be better distributed, in order that the house-drainage may be improved.

3. At Corfu the quantity is sufficient, the quality bad, but the supply, such as it is, although not used by the civil population for house drainage, is laid on to the barracks.

4. At all the other Ionian Island stations the present supply is deficient in amount.

5. Except at Corfu there is no barrack in the Mediterranean commands in which water is laid on. The method of distribution employed is that usually adopted for temporary camps rather than what is required for permanent barracks, and, as a consequence, there is absolute deficiency of water for cleanliness and for drainage. These defects can only be remedied by providing suitable raised distributing tanks, to be supplied with water by force pumps from existing underground tanks, or from pipes, when, by improvement in the supply and distribution of the water for the civil population, a supply by gravitation becomes available. Water from these raised tanks to be laid on for use all over the barracks.

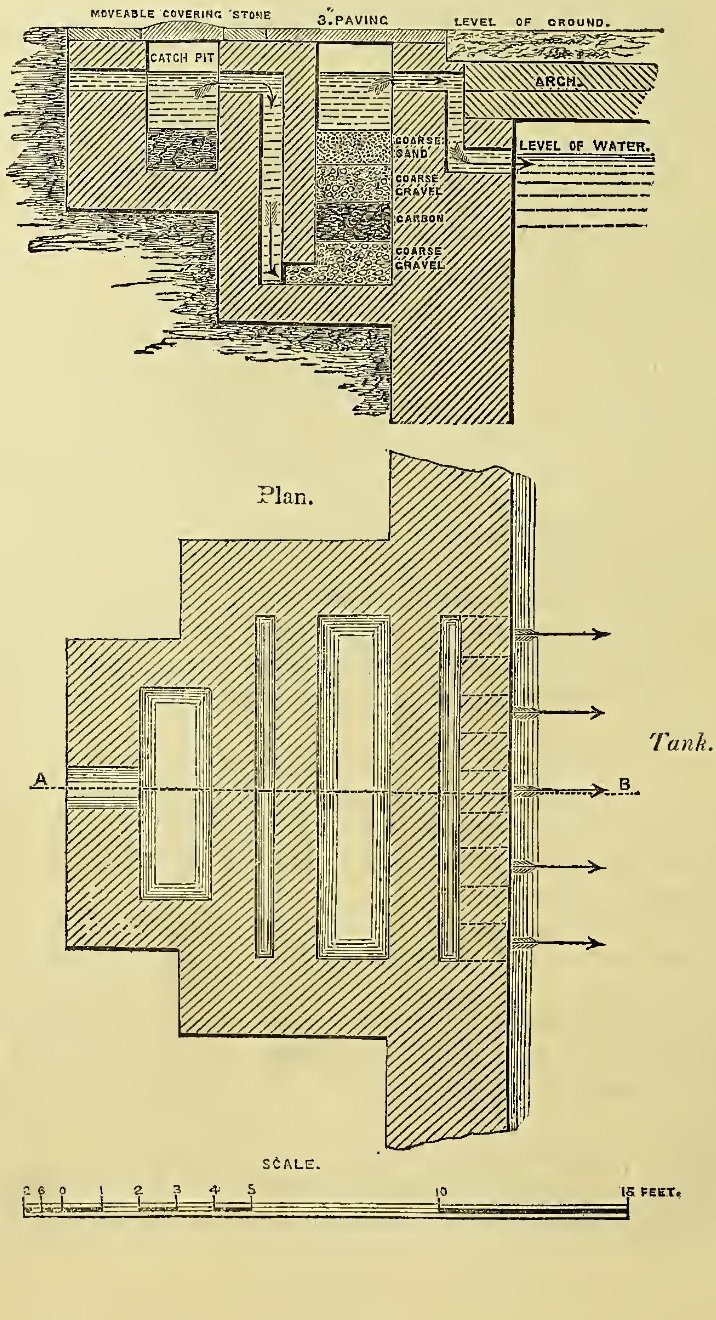
6. We recommend that drinking fountains be introduced in all barracks.

7. Wherever at any of the stations water is not filtered, we recommend that, where rain water has to be stored, it should be passed through a downward and upward filter, consisting of gravel, sand, and charcoal, before it is allowed to enter the tank.

The form of filter we propose for this purpose is shown in the following Figs. 1 and 2.

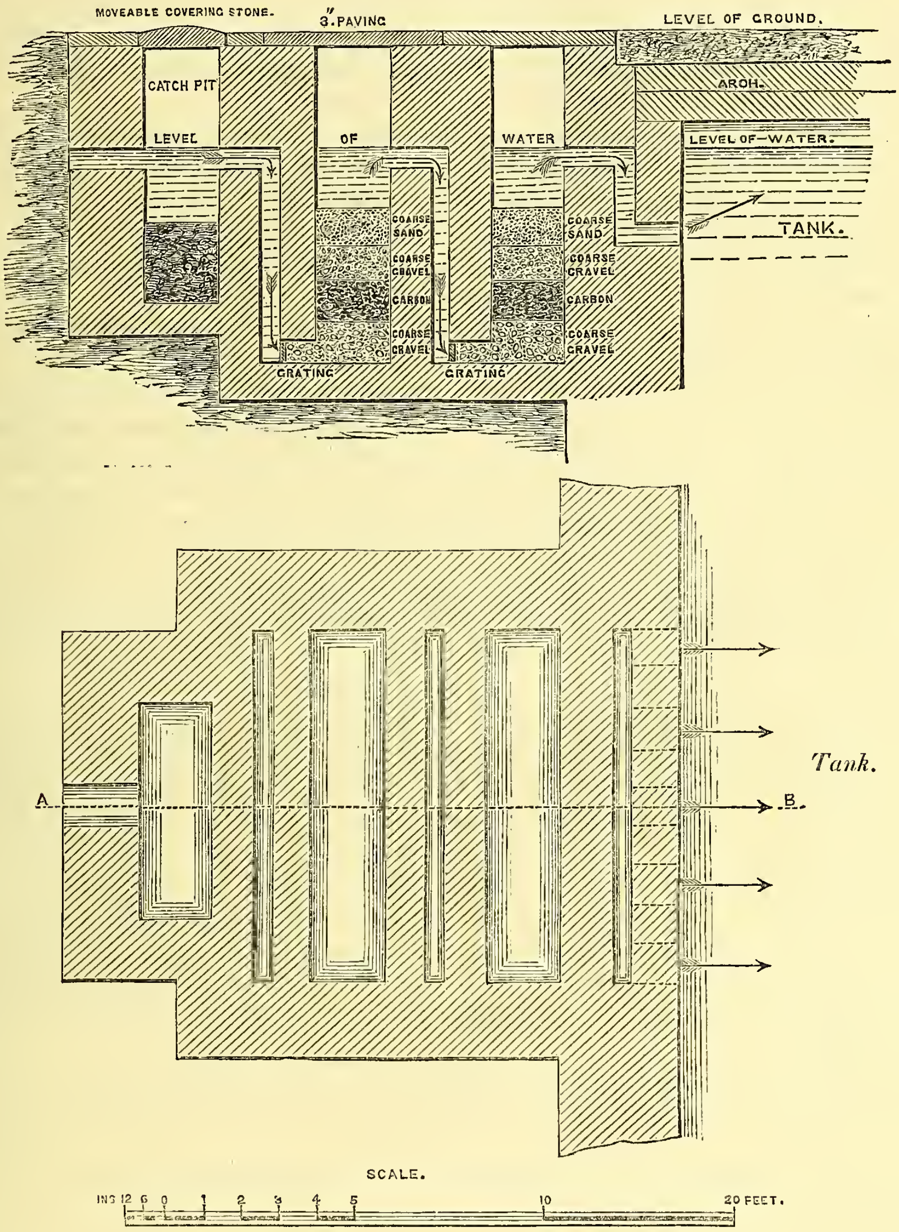
Fig. 1.—Detail of Single Filter for Rain-water Tank.

Section on Line A.B.



The size of the filter must of course vary with the quantity of water to be passed through it. A double filter, as shown on Fig. 2, is sometimes desirable. Care should be taken to cleanse the filters periodically.

FIG. 2.—DETAIL OF DOUBLE FILTER FOR RAIN-WATER TANK.
Section on Line A.B.



9.—LATRINES AND URINALS.

We found the latrine accommodation very defective at nearly all the stations, both for barracks and hospitals. Except at the New Europa huts at Gibraltar and at the New Pembroke barrack, Malta, none of the recently improved latrines had been introduced. The usual arrangement for latrines at a short distance from the sea, both for barracks and hospitals, is that of a trough communicating with a drain, which is only a cesspool having open ladder seats over it. There is no water supply. The only cleansing is effected by throwing waste water into the trough. Where the latrines are nearer the sea there is usually an opening into which the sea washes. In one or two instances the latrines are over the sea. At Malta there is a latrine in use which is common in the island. It consists of a long shelving trough of porous stone, having an opening into a drain at its deepest end. This opening is closed by a stick, the end of which is shaped like a ball. Water is supposed to stand in the trough, and to be discharged by lifting the stick; but it generally escapes on account of the bad construction of the valve. There is sometimes no water laid on, and what is used for cleansing has to be carried by hand. In cases where water is laid on, it often trickles slowly into the latrine, and affords no means of thorough cleansing. The practical result is that these latrines are universally offensive, and that much nuisance arises from them.

We propose to supply all the barracks with latrines on one or other of the following Plans.

Plan XII. shows the form made by Mr. Jennings, and which has been recently introduced and found to answer at a number of barracks. It consists of a horizontal cast-iron pipe communicating with the barrack drain, having a number of earthenware soil pans opening into its upper side. There is a water tank above, from which water is supplied by pressure to each pan and also to the horizontal pipe. There is a discharge valve with an overflow to keep the water at a proper level. By raising this valve, the contents of the latrine are discharged, and there is a simple arrangement whereby a forcible stream of water is projected round each pan and through the pipe to cleanse them. The water then resumes its level, and the latrine is ready for use.

It resembles an ordinary water-closet in appearance, and requires a very small amount of water to keep it clean. It should be discharged once or oftener every day, according to the season and the number of men in the barrack, to prevent nuisance from it.

This latrine is well adapted for hospital use where the water supply is too limited to enable the ordinary water-closet to be introduced, and in climates where a patient can traverse a distance of a few feet under cover, but in the open air.

Another latrine, which has been found efficient in practice for barracks, is that made by Mr. Macfarlane of Glasgow. It is shown in Plan XIII.

The apparatus consists of a continuous iron trough having a discharging valve at one end, and a water supply at the other. There are seats, with divisions and doors as in the other form of apparatus, and the discharging and refilling are done in a similar manner.

This latrine has been successfully introduced into a considerable number of barracks, but it is not so well adapted for warm climates or for hospital use as the other on account of exposing a larger surface of water.

In the Mediterranean barracks with few exceptions, the latrines can be drained to existing outlets. But there are instances, as at the Polvcrista Gate barracks on the Cotonera lines at Malta, where there is no outlet for the drainage, and much nuisance arises from the cesspits in use.

This we propose to remedy, at least until an outlet can be obtained, by discharging the latrines into a raised iron tank, from which the matter may be drawn off at stated periods into a water-tight cart and removed to the sea, or used for manure, which would be very much better. With such a climate and soil every particle of organized matter has its value as a fertilizer.

With few exceptions the latrine buildings are deficient in light and in ventilation. Those of them which occupy casemates are all dark and very offensive. Every additional square foot of space for light and air which the structure will admit of should be given. Detached latrine buildings should be ventilated and lighted through the roof. There should be ventilating openings in the walls, and a large louvre carried along the entire length of the ridge.

In every instance in which the improvement can be introduced without interfering with light, ventilation, and cleanliness, there should be divisions between the seats and half doors.

The floors should be flagged and properly drained and channelled, wherever improved flooring is required.

Whatever form of latrine may be used, attention should be bestowed on its efficient working and cleanliness. Regular cleansing and filling the apparatus with water are necessary in every case, and the regiments should be required to see that this is done. Even at home, and with the best arrangements, neglect of so simple a precaution frequently entails nuisance.

Urinals.—None of the barracks are provided with good day urinals, and the only instance of the introduction of night urinals we met with was in the New Pembroke Barracks, Malta. In this instance, although the position is good, the material used, namely, soft porous stone, is unsuitable, and the result is bad.

Barrack day urinals are generally a trough of stone more or less porous. They are not supplied with water for cleansing, and all are very offensive.

For these climates day urinals should be made of impervious material. Slate would answer sufficiently well. It should be carefully joined at the angles, and the floor well channelled and drained. Where water is so scarce as it is at these stations, it would be impossible to lay water constantly on for cleansing, but a water supply could always be provided at hand, for the urinal to be cleansed daily by hand labour. This, like the cleansing of the latrine, should be made a part of the daily barrack cleansing. Urinals should never be placed under the same roof as the latrine. They should be in the open air, with simply a roof and a sufficient screen; and they should always have a separate drainage, and never into the latrine. Any oversight in this matter will increase greatly the nuisance both from latrines and urinals.

On Plan XIII. is shown the construction of a day urinal of slate, placed in front of a set of Macfarlane's latrines. It consists of a sloping back of slate, with vertical slate divisions 2 feet 6 inches apart. The construction is simple, and admits of easy cleansing, but this urinal exposes a large surface to the air.

To obviate this disadvantage, and to economize water, Mr. Jennings has made a day urinal in which water stands at a constant level, regulated by an overflow pipe and water valve. A small stream of water flows into the basin from a supply pipe, so as to dilute and carry away the contents of the basin, and to prevent the deposit of urea. An elevation, plan, and section of this urinal are shown in Plan XIV.

Great difficulties exist in providing night urinals for the present barrack rooms at these stations, where this class of accommodation is even more required than at home, on account of more rapid decomposition and the stagnant condition of the air, caused by higher temperature of the climate and the casemated construction of the rooms.

Wherever there is an unlimited supply of water, and suitable space, barrack room urinals can be constructed, but in the existing Mediterranean barracks, both of these elements are deficient.

In most cases it is difficult to find any space in which to construct a suitable recess for night urinals, and in every instance there is not sufficient water to enable urinals with water continually running through them to be made use of.

Only one form of apparatus has yet been contrived in which the advantages of a water supply are to any extent secured, with due regard to economy of water. It is an earthenware urinal constructed by Mr. Jennings, somewhat resembling a small water-closet, with a trap, plug, supply pipe, and overflow. It is shown in Plan XIV.

When in use it is filled to a certain level with water by raising the handle and letting it drop. A body of water is thus obtained for purposes of dilution, and any addition made during the night to the contents, passes off diluted by the overflow pipe. In the morning, the person in charge lifts the handle and the contents escape by the pipe. A stream of water washes the whole surface, and by using a brush at the same time, the urinal can be washed clean. On dropping the handle, the water rises to its level, and the apparatus is ready for use.

This urinal, with proper care in cleansing, can be kept sufficiently sweet to enable it to be placed in any small compartment, which can be constructed for it out of any ordinary barrack room. The compartment requires a swing door, to be locked during the day, and a window direct to the outer air, with sufficient ventilation. The floor of the compartment should be of slate, with a wooden grating or board for the men to stand on, which should be well washed every day and renewed when it becomes offensive. Wherever practicable, it is better to place this urinal in a small compartment separate from the barrack room, to be reached by a step or two in the open air, but under roof cover. This could be done without risk in these climates. Many barracks are more or less overlooked from the houses of the civil population, and in constructing any detached urinal accommodation, it would have to be done with reference to this fact. Each case will have to be carefully considered on the spot, because the position of night urinals for existing casemates, with due regard to cross ventilation, decency, and access under cover, is almost as difficult a problem as constructing a urinal.

There is one point in the construction of urinals which has been recently much insisted on as affording a means of cleanliness for the men, and in this way diminishing their liability to venereal affections. This is to place over each urinal a small water tap at a convenient height. We consider that this improvement is well worthy of a trial, and we would recommend its introduction.

Wherever a separate porch with a cross ventilation between it and the barrack room door can be obtained, a urine tub lined with pitch might be used instead of the water urinal. At Pembroke Barracks, Malta, the urinal is in such a porch. The Pembroke barrack rooms have doors and windows at opposite ends, and the porch is placed opposite one of the doors, so that the other door is free. But where the casemate has only one door with windows beside it, there might be risk of injuring materially the ventilation of the room by placing the porch opposite the only door. The best place for it in these cases apparently would be to one side of the door, provided it could be reached without the men being seen from the outside.

If the side windows of adjacent casemates were partly converted into doors, leaving the upper part glazed as at present, and if the porch were placed between the casemates, this would probably be the best arrangement under the circumstances.

One porch would thus answer for two adjacent casemates. It should consist simply of a screen wall with a sloping roof, leaving an open space of a foot all the way round between the roof and the top of the wall. It would have to be divided up the middle into tw compartments, one for each casemate, and each compartment would require a door to the outside for removing the urine tub and for cleansing, without passing through the barrack room.

The principle of this arrangement is shown in Plan XV., where it is applied to a barrack hut with a verandah.

In new barrack huts the arrangements may either be of this kind, or one or other of the methods of placing the night urinals shown in Plans I., II., III. may be adopted.

Where a urine tub is provided in a separate porch the water tap already mentioned might be placed over it.

10.—Ablution and Bath Accommodation.

Sea bathing is in use at all the stations. Fresh-water baths, as a means of cleanliness, have not yet been introduced. For this latter purpose sea-bathing alone cannot be relied on, because sea water does not cleanse like fresh water, unless marine soap be used at the same time. At Malta and Corfu there would be water enough under improved methods of distribution to afford the means of fresh-water bathing. At Gibraltar and at the smaller Ionian Islands stations it is to be feared that fresh water will, under any circumstances, not be available for baths. We have recommended a few salt-water baths on trial, with an issue of marine soap. If these are found sufficient for cleansing, the number can be extended, and the baths could be used with fresh water if at any subsequent time a sufficiency should become available.

Baths are made of metal, enamelled, painted, or galvanized; the cheapest material is perhaps slate, which is found to answer every purpose. The common slate bath is shown on Plan XVI.

Also a modification of it by Mr. Jennings for preventing waste of water. The glazed terra cotta bath, by Rufford and Finch, shown in the same plan, is too costly for barrack use, but it is the most suitable for hospitals on account of its cleanliness, and better adaptation for preventing waste of heat when warm baths are used.

There is sufficient water everywhere for ordinary ablution purposes, but in consequence of defective distribution of water, and general insufficiency in the ablution arrangements, the means of personal cleanliness are, even exclusive of baths, insufficient for the requirements of the climates.

In most cases water is not laid on, but has to be carried by hand. Sometimes part of the supply is carted by a contractor. At not a few barracks the ablution rooms are of a very inferior kind. There is scarcely a good ablution table to be met with. At some barracks there is no ablution room, and the men wash in their rooms, or in the open air outside.

Generally it may be stated that the inducements to cleanliness are insufficient, and that the ablution arrangements require either great improvement or entire re-construction.

Instead of the present wooden or porous stone slab, with moveable iron basins and no water laid on, we recommend that ablution tables of slate, with sunk earthenware basins, and water laid on to each basin, be introduced. Also that a sufficient number of foot-pans, now made of earthenware, be provided. Water should be obtained either from a raised tank for supplying water for all purposes, or from a special tank for affording water to the ablution room.

Plan XV. shows the most recent improved form of earthenware ablution basins and stands.

The ablution rooms are often dark and deficient in ventilation. This is especially the case with those in casemates. It is difficult to remedy this defect, unless by building a proper room.

A good, light, clean, cheerful room, with plenty of air, and water laid on to the basins, and proper drainage, are essential requisites for cleanliness. There are examples of ablution rooms of this kind at the new barrack huts at Gibraltar, and also at Pembroke Barracks, Malta, and they bring out very strongly the deficiences of the same class of accommodation in other barracks.

The ablution and bath room shown on Plan XVII. is sufficient to give an idea of the kind of accommodation required for existing barracks. The number of basins and baths would of course depend on the size of the barrack.

In all new barracks the best arrangement of ablution rooms is to attach a small room to each barrack room in the manner shown in Plans I., II., III., and to fit it up with a few fixed basins and water laid on. This has been done in all the recently constructed barracks at home.

In new barrack rooms where this arrangement is adopted, a separate bath house, with a number of baths proportioned to the size of the barrack, should be provided in a convenient position.

11.—Cook-houses.

All the barracks have cook-houses. Some are in casemates, others have been specially erected for the purpose. They differ very much in character; but taking the climates into account, they are, with few exceptions, insufficiently ventilated, very hot, and they do not admit of much improvement in these respects. Except the new cook-house for the Europa huts, and the one belonging to the Pembroke Barracks, none of them are provided with good cooking arrangements. They have all boilers of the old pattern. Some of them have stone ovens of bad construction, requiring a large amount of fuel to heat them; only one or two have a water supply, and the drainage is generally defective.

We have given the details for every barrack in the reports, and we would merely state here that the ventilation and temperature of all these cooking places should be examined when the dinners are being cooked, and the ventilation improved by louvres or openings facing the wind, as far as it may be practicable to do so.

Improved forms of cooking apparatus are described in the general report of the Barrack and Hospital Improvement Commission.

The new steel ovens and boilers, Plan XVIII., recently introduced at home, are the most durable and economical yet devised, and should be put up instead of the present insufficient arrangements. They admit of being adapted to barracks of any size; but where 400 or 500 or more men have to be cooked for every day, Benham's apparatus will be found very convenient and economical, provided it be properly constructed and managed. Such of the cook-houses as do not admit of sufficient improvement (like the one at Fort Manuel, Malta) should be replaced by buildings of proper construction, as shown in Plan XIX.

They should all be drained and supplied with sinks, and water should be laid on. Proper dressers and tables should also be provided.

12.—Cleansing.

At most of the barracks the barrack refuse is collected and retained in ashpits, often in confined localities and close to the men's rooms, until it is removed by the contractor. This practice gives rise to nuisance which is much more likely to be injurious to health in these warm climates than at home. We recommend that all these ashpits be abolished, and that the places occupied by them be raised above the level of the ground and flagged. Iron boxes should be provided on these spaces to receive the refuse, and their contents should be emptied and removed daily.

13.—Hospitals.

In consequence of our attention having been specially called to the condition of the hospitals, with a view to improving the existing buildings as far as practicable, we examined all the establishments minutely, and we have stated in our reports the facts in regard to each hospital in detail.

There is no military hospital at Gibraltar. The accommodation for the sick in that large garrison is in a hospital belonging to the Royal Navy, and lent during pleasure to the War Department.

Like most naval hospitals, it is an excellent building, but its general arrangements are those of a naval and not of a military hospital. Considering the tenure on which it is held, we could not recommend its improvement to the extent we should otherwise have desired, but we have recommended alterations and additions, which, when complete, will improve materially its sanitary condition, and enable it to be organized as a general hospital.

There is not a single good military hospital in Malta.

There are four hospitals, all of a very inferior description, and all bad except the Spinola hospital, which is a private house in the country, and has the advantage of fresh air, doing work which could be done much better and cheaper by one good general hospital, with ambulances, or at most by a general hospital for Valetta, and a subsidiary one for the Cotonera barracks. Besides these four hospitals there is a fifth, a sanitarium at Citta Vecchia, seven miles from Valetta.

The real reason of this multiplication of establishments is the bad state of the principal hospital. We have carefully examined the hospital question as regards this garrison, and have been reluctantly compelled to arrive at the conclusion that none of the existing buildings within the garrison can be rendered sufficiently good for the reception of sick at any moderate cost. We have, therefore, recommended, for reasons stated in the report, that the existing buildings should be altered, to render them fit for extending the barrack accommodation, and that one general hospital should be erected for Valetta, and a small subsidiary hospital for the Cotonera side of the great harbour. The excellently situated sanitarium at Citta Vecchia we propose should be retained for convalescents.

The hospital at Corfu is a casemated building in two floors, not on a good plan, but admitting of alteration and extension which will render it sufficient for the wants of the garrison.

The smaller hospitals at the other Ionian Islands vary much in character. The hospital at Santa Maura would be sufficient with the trifling addition of an orderly's room and bath room.

The hospital at Cephalonia is sufficient, but requires improvement in a few sanitary details.

The hospital at Zante Castle is perhaps the best in the command. It is of recent construction, and occupies a lofty, airy position.

There are no hospitals at Paxo and Ithaca. Both garrisons have their sick treated in private houses rented for the purpose. The hospital at Ithaca is a single floor of a very inferior house, and affords the worst accommodation for sick we have ever met with.

For these small stations, and for detachment stations generally, a small hospital similar to the one proposed for Cerigo, Plan XX., would answer every purpose.

All the Mediterranean hospitals are more or less overcrowded, especially as regards superficial area per bed, which is the most important element in these climates. In the new hospitals we have proposed to build at Malta we have adopted the regulation of 1,500 cubic feet, and about 100 square feet per bed.

None of the existing buildings have any special means of ventilation, and all require foul air shafts and inlets for fresh air constructed on the same principles as those we have recommended for barracks.

In these climates the more ventilation by open windows is trusted to the better, but a constant movement of the air should also be provided for, when on account of the weather the windows have to be kept closed.

All the defects we have described in the barrack drainage and latrines recur in the hospitals. In some instances, indeed, these defects are worse than in any barracks. All require the same class of remedies we have advised for barracks. None of the hospitals have any water-closets. They have only offensive latrines. We have as far as practicable recommended water latrines or water-closets to be provided for the wards.

The ablution and bath arrangements were everywhere deficient. These have been undergoing improvement since the time of our inspection, but at that date there was not a single hospital possessing suitable provision either for washing or for bathing sick.

We have recommended suitable ablution rooms, with baths and water laid on, to be introduced wherever practicable.

We found none of the hospitals provided with convenient administrative accommodation, and the arrangements for orderlies and hospital serjeants were all more or less deficient. We have recommended that proper accommodation be provided for the attendants, to obviate the necessity of their sleeping among the sick.

PART II.—BARRACKS AND HOSPITAL AT GIBRALTAR.

We shall include in this part of our report a short sketch of the topography, climate, and diseases of the station, together with an account of the sanitary condition and improvements required in the town, barracks, and hospital.

SECTION I.—TOPOGRAPHY, CLIMATE, DISEASES, &c. OF GIBRALTAR.

1.—Topography.

The rock of Gibraltar is a lofty peninsula projecting into the straits, and extending in a line nearly north and south, in latitude 36° 6′ 20″ N., and in longitude 5° 20′ 53″ W. The extreme length of the rock, from Forbes' Battery to Europa Point, is about 4,760 yards, and its extreme breadth, from King's Bastion to the neighbourhood of Catelan Bay, is about 1,600 yards. Its physical character is that of a broken rocky ridge running north and south, having very steep rugged slopes on the west and south sides, and vertical precipices on the north and east sides. The highest line of the ridge, which is in some places so narrow that it can be crossed almost by a single step, is broken into three principal summits. One at the northern extremity, called the "Rock Gun," is 1,350 feet above the sea level; Saint George's Tower towards the south end, above Windmill Hill is 1,439 feet, and the signal house which lies nearly midway between these two points is 1,276 feet above the sea level.

From the central ridge a succession of terraces and slopes of greater or less breadth and inclination, fall towards the west and south, occupied by gardens, paths, and roads, private residences, batteries, promenades, barracks, and by the town itself. Most of the town, however, is built on a talus of red earth, extending from the sea-shore some distance up the slope, and re-appearing high up in cavities in the rock. A similar talus, but of sea sand, extends on the east side from the sea level to a considerable height up the rock. The east side of the rock is washed by the Mediterranean, the west side by the waters of the bay of Gibraltar, and on the north side the rock is connected with the coast of Spain, by a neck of sand about a mile long and from half a mile to a mile broad, raised a few feet only above the level of the sea, and partly covered with water during the rainy season. Water is generally found in the sand within four feet of the surface.

The rock consists chiefly of a hard limestone breccia, with a few fossils found in cavities. There are several large caves with animal remains: deep rocky ravines towards the southern extremity; and large natural gulleys which concentrate the rain-fall of the higher slopes on the upper part of the town. The rock is almost surrounded by the sea, and being exposed to no extraneous source of malaria, it ought, so far as its topography is concerned, to be a healthy locality. There is, however, one vulnerable point of the very greatest consequence as regards health, according to the manner in which it is dealt with, and that is the talus on which the town is built, with the slopes and gulleys above it. As already stated, this talus consists mainly of red earth, a substance capable of absorbing and retaining a large quantity of water or of any other fluid poured into it. It has, indeed, hitherto been a considerable source of water supply for the population. So much water does this peculiar earth imbibe, that when we were at Gibraltar, at the end of the hot season, a section of it exposed in one of the streets was saturated with moisture. We shall recur to this part of the subject when discussing the question of drainage, but we may here remark, in passing, that if from any faulty direction of walls or substructures, or from any neglect of house or other drainage, such a subsoil becomes charged with water or with sewage matter, it will certainly give out dangerous or fatal malaria, under high temperature and other favouring atmospheric conditions.

Another very important topographical peculiarity has resulted from the construction of the defensive works. These works are built on the sea-shore at the water level, along the entire front of the town: their foundations are sunk far below the surface, and they would, in the absence of a very complete system of drainage, form a barrier between the rain-fall flowing down from the heights above and its natural outlet, the sea. The flat ground lying within the wall, and on which the lower part of the town is built, would, in such a case, become the depository of the whole of the drainage. Besides this, outside the works, at a distance of 60 to 80 yards, a low breakwater for defence purposes has been carried along the front of the town. Between it and the wall is a strip of shallow sea water, which, at low tides and under a hot sun, becomes exceedingly offensive from the decomposition of the salt water by organic matter from the town sewage, which is poured into the bay along the line.

It will be seen that it is within the province of ordinary engineering to remove all these contingent topographical defects, and if this be done, the rock may become a healthy and agreeable residence.

The other topographical details will be more readily understood by reference to the map and sections, Plans XXI., XXII., XXIII., which will show how small an amount of level ground there is within the fortress, and how large an area is covered by its densely-packed population.

2.—Climate.

There is an excellent meteorological observatory at Gibraltar, until recently in charge of the Royal Engineer Department, from the carefully kept records of which, abstracts given in the Appendix No. 1, have been made for us. They show the climate of the rock to be insular in its character, neither very moist nor very dry, not subject to extremes of heat or of cold, but possessing a high sun temperature, the effect of which on the sensations is even greater than the thermometer would appear to indicate. The prevailing winds vary considerably in different years, but there is generally a large amount of east wind, which has a peculiar effect on the climate while it lasts. It is often accompanied by local fogs, occasioned by the warm moist air of the Mediterranean being thrown upwards by striking against the rock to an elevation sufficient to deposit its moisture. In the Abstracts of Climate, 1853-4, published by the War Department there is an interesting note from Major-General Harding on the physical effects produced by this wind. He states that oil paint, if laid on during the east wind, will not harden, but remains adhesive, and retains this quality for one or two years on a recurrence of easterly wind, although apparently dry when the wind is west. Meat will not keep. If a divided leaf of the terebinth tree be floated on water when the wind is westerly, the oil comes out of the pores in jets and moves the leaf about, but in an east wind the oil comes out in a liquid state and the leaf is motionless. The east wind is charged with producing all manner of ailments, mental as well as bodily, while it lasts, but it does not appear to inflict any permanent injury on health.

The amount and regularity of the rain-fall is a point of primary importance to the garrison, because it is the chief source of the water supply, and accordingly records of it have been kept for a long series of years. The annual quantities from 1790 to 1860 are given in Appendix No. 1, and show a very great diversity in different years. The smallest rain-fall on record was in 1836, in which year the quantity was little more than 13½ inches. The largest recorded fall was in 1855, when it was nearly 76 inches. The mean rain-fall of all the years of observation has been 32·809 inches. There has been a very deficient rain-fall in six years out of 71 years. There is usually very little rain in summer. Sometimes there is none for several months. The rainy season usually commences late in September or early in October and continues till the end of spring. Frequently a large amount of rain falls in a few hours, deluging the streets; flooding the very large iron gratings over the sewers, and bursting the main sewers in the low districts close to the sea.

Notwithstanding heat, east wind, and heavy rain, the climate of Gibraltar is a fine and healthy one, at least for healthy people; but certain classes of invalids recover much more rapidly when sent away from it.

3.—Diseases of the Native Population.

The populations of the southern provinces of Spain have been in times past specially subject to periodic fevers,—intermittent, remittent, and to yellow fever. Since the beginning of the present century, as shown by the late Inspector-General, Dr. Gillkrest, in his report on the disease,* no fewer than 59 localities in Andalusia, 16 in Murcia, and 11 in Valencia have suffered from yellow fever. In many of these places he states that the disease was confined to circumscribed localities, where the sanitary conditions were notoriously defective, and did not extend to the mass of the population.

Gibraltar, situated at the southern extremity of Andalusia, is one of the 59 localities where yellow fever has prevailed in this province. The first recorded attack was in 1649. Since the date of the British occupation in 1704, there have been five epidemics, of greater or less severity, occurring in the years and occasioning the mortality, shown in the following table:—

Years.	Mortality.	
	Military.	Civil.
1804	869	4,864
1810	6	17
1813	391	508
1814	114	132
1828	507	1,170

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* General Board of Health, second Report on Quarantine (Yellow Fever) 1852. Appendix No. 1.

There is evidence to show that in the intervals between the epidemics, remittent fever, sometimes bilious remittent, frequently prevailed, and that occasionally there were sporadic cases of the more severe form, yellow fever. But the sanitary history of the garrison is very imperfect, and no exact account of any of the epidemics in all their relations has come down to us. If half the care had been spent in ascertaining facts, that was at the time bestowed on proving yellow fever to have been imported and not of local origin, humanity would have been greatly the gainer. It appears for many years to have been deemed a heresy in any person to assert that remittent fever was of usual occurrence either among the civil or military population; and we have positive evidence that, until the late Dr. Hennen went to Gibraltar, cases of remittent fever were compulsorily reported as continued fever, lest the real facts of the case should weaken the presumed evidence for yellow fever being of foreign and not of local origin.*

Nevertheless, the evidence of experienced medical men, who had no theory to support, is sufficient to prove that bilious remittent fever has been in times past not an unfrequent indigenous product of the rock. It would be quite beside our duty to enter further into this discussion. What we have to do is to ascertain generally the nature of the diseases to which the population is now liable, with the view of examining into those local conditions which experience has shown to favour their origin and propagation.

With the view of arriving at the facts we called for the mortality statistics of the civil population. The result for 1860, the only year for which we could obtain it, is given in the Appendix No. 2, printed as we received it. It will be seen from this return that no proper system of registration is yet in force in Gibraltar. The police do the best they can to arrive at the facts, but neither the nomenclature nor arrangement conveys any definite information on some of the most important points of the inquiry; and the chief value of the return is, that it proves the necessity for assimilating the registration at Gibraltar to that in use at home. We endeavoured to ascertain how far it might be practicable to do this, by obtaining the statistics of sickness and mortality among the indigent poor attended at their own houses. Deputy Inspector-General Paynter was good enough to undertake the labour required in reducing the data into some general form, and the result of his work is contained in the Appendix No. 3, giving the admissions and deaths arranged according to the nomenclature and classification adopted in the army returns, which are essentially the same as those used by the Registrar-General of England. This table contains the only reliable information as to the nature of the diseases of Gibraltar we have been able to procure. It is sufficient to show how advisable it would be to reduce all reliable existing data into the same form for public use, to save as much as possible of the past sanitary history of this important garrison from oblivion.

Dr. Paynter's table shows that 41½ per cent. of the admissions, and 16½ per cent. of deaths, among the poor, were due to miasmatic diseases; and the police returns attribute above 20 per cent. of the mortality in the town of Gibraltar to the same class of maladies. The police return for 10 years gives a total mortality of 30·4 per 1,000 per annum, which is a very high rate on a small fixed population of 15,562 living in a climate not unfavourable to health.

The police return of mortality for one year, 1860, shows a considerable difference in the health of the two extremities of the rock. The southern end, which is inhabited by a sparse population of 1,664 persons, yielded a death rate a little over 27½ per 1,000; while the densely-peopled town of Gibraltar, with a population of 13,898, showed a mortality of above 36 per 1,000. The prevailing diseases are fevers, and other zymotics, tubercular, and chest diseases. It is a singular circumstance that above 10 per cent. of the deaths are returned as due to old age. The mortality under 5 years is 35½ per cent. of the whole. Dr. Paynter's return is the only one which affords any satisfactory information as to the nature of the fevers. It shows that out of 197 cases admitted, 9 belonged to the periodic class, and all were mild intermittents. Common continued fever gave 180 cases, with 3 deaths, and there were 6 cases of typhus and 4 of typhoid fevers.

The evidence, such as it is, and also the statements of medical men at Gibraltar, go to show that remittent and other periodic fevers have become less frequent of late years among the civil population.

Although far greater attention has been paid to drainage and cleansing of late years than was formerly the case, much remains to be done before Gibraltar can be considered safe from outbreaks of epidemic fevers and other epidemic diseases. There was an outbreak of cholera in 1860, which carried off 38 persons in the town, a very considerable mortality for so small a place, and this event is quite sufficient to show that there are still sanitary defects in the garrison highly dangerous to the public health.

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* Second Report on Quarantine, p. 130.

Although the importation of yellow fever in 1828 was at one time a favourite hypothesis, both with the inhabitants and authorities, who were afraid of the commercial results likely to arise from admitting that the disease was indigenous, there were not a few enlightened men who saw clearly that there were local causes within the garrison quite sufficient to account for its local origin and extension.

Then as now the town had a clean external appearance, although it is very doubtful whether it had ever been as thoroughly and continuously cleansed as has been the case since the last epidemic. When the houses were examined the internal sanitary condition was found to be very different from external appearances. The houses were overcrowded, 100 persons were found in one house fixed by police regulation for only 20 ; their construction and arrangement were incompatible with free ventilation ; the courts and houses filthy, the drainage as bad as possible, the sewers choked with filth to such an extent that in one street close to the Town range barracks from 20 to 30 cart-loads of filth were removed from a sewer which was opened in it. The sewers were the cesspits of the whole population. Every shower of rain increased fermentation in their contents, and foul air was poured into all the small courts and houses through the open gulley grates. The condition of the sewers was such that even rats died in them. This most dangerous state of the drains extended to nearly every building, and no doubt the whole population was as thoroughly prepared for the yellow fever epidemic before it appeared as dry wood is for fire. In the district where the disease first broke out the pauper population was " dense to a degree incredible ; " " living in sheds without drainage, generally " composed of the slightest materials, in tiers of beds as close as in a crowded transport " numerous individuals slept."*

We now know the very important part which impure water plays during epidemic seasons in determining fatal outbreaks of disease, although this was little considered at the time yellow fever prevailed in 1828. At that period the chief sources of the water supply for the civil and military population were shallow wells dug in a subsoil saturated with filth. Rain-water tanks were not in use even for the troops until within the last 25 years, and not for the civil population until several years later.

As already stated, there has been considerable improvement since that time. Drainage and paving have been extended, rain-water tanks have been introduced, and cleanliness more strictly enforced. Overcrowding is kept down as far as practicable, but there is much yet to be done. The present mortality is excessive, and the prevailing zymotic diseases are those connected with overcrowding, want of domestic cleanliness and defective ventilation, bad water supply, bad drainage, and sewer gases. His Excellency the Governor and the civil departments under him are alive to the importance of the subject, and measures for improving the water supply and main drainage of the town and garrison have been for some time under consideration. Frequent representations on various important matters of detail, affecting the health of the garrison and troops, have also been made both by military and medical authorities. Hitherto little practical result has followed from their proposals, and the time has certainly arrived when these various questions should be dealt with, and this important garrison placed as far as practicable beyond the influence of epidemic diseases.

We next proceed to describe briefly the present sanitary condition of the town itself, together with the measures required for improving it.

4.—SANITARY CONDITION OF THE TOWN OF GIBRALTAR.

1. CONSTRUCTION OF HOUSES.—As already stated, the population of Gibraltar is located on two divisions of the rock, one at the northern, the other towards the southern extremity. The former includes the town, and is cut off from the latter by a fortified wall.

The town area covered by houses is about 1,200 yards in length by about 400 in breadth, and contains in round numbers, 100 acres ; the permanent population is 13,898, giving a density of about 69,000 persons per square mile. The occupied surface presents very different degrees of fall. A large portion of the town, about a third of the whole, is built on a strip of comparatively flat ground between the steep slope of the rock and the line wall from 12 to 20 feet above high-water mark. The remainder is built chiefly on the slope on terraces, one over the other, rising to an elevation of 210 feet above the same level. Over this again rises the lofty rocky ridge already described, with its descending gulleys so arranged that they concentrate the rain-fall on the upper parts of the town. In the absence of drainage, the water flowing down these gulleys would have to find its way to the sea, either over the surface or by sinking into the porous talus of red earth already described, on which the whole of the lower part of the town is built.

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* The details are given in the report already cited.

With the exception of secondary cross streets the rows of houses are built across the natural course of the drainage. In many cases the rock or bank is scarped to find room for the streets and lanes, and the houses abut on the rocky or earthy section. The natural disadvantages of the site are very considerable, and without due care as to cleansing and drainage, it must undoubtedly be prejudicial to health and predispose to fevers and other epidemic diseases. But fortunately all, or very nearly all, these disadvantages can be neutralized by sanitary works. A portion of these works has already been designed and executed, and there is every prospect, if the further works which we shall recommend are carried out, that the garrison will become as healthy as it ought to be from the fine local climate.

But unfortunately, the older part of the town has been built without regard to health. Many of the houses are very bad and would be considered as unfit for human habitation at home. Several which we examined presented very extraordinary specimens of house architecture. Their condition will be best understood from the following sketch of their construction: Suppose an area of ground, about 40 feet square, enclosed within four solid walls 40 feet high with a doorway through one side. Suppose, again, three or four floors of rooms built against these walls inside the area, leaving only a narrow court a few yards in width between the opposite rooms, the doorway through the wall affording the only means of ingress to the court. These houses would have windows only to the court and no through draft. Suppose, besides, that the court is badly paved, with an open gulley or two, and an open privy communicating with a sewer loaded with filth, and that the houses are most of them dark, all of them unventilated and overcrowded, that they are occupied by people who carry on trades and manufactures in them, and often store in the houses all kinds of worn-out refuse articles. Suppose all this in a hot climate, and a very good idea will be formed of the sanitary state of the population in the lower parts of the town. The bane of this form of house construction is the narrow inner court, without any ventilation for the houses except what comes down from the top. No engineering works will remedy this. It can only be remedied by reconstruction. No openings can be made in the outer walls of the houses because there are other houses similarly constructed beyond. The only way to improve these places is to pave and drain them properly, and to enforce the most rigid attention to cleansing, both within and without the houses.

But prevention of nuisance is the only thing over which the local authorities have power at present. They cannot enter the courts or *patios* to compel either paving or draining; in other words, however desirous they may be, they cannot compel efficient cleansing, for this is impossible without good paving and draining. This power of entry is absolutely necessary for public safety, and until it is granted to the authorities the public health of Gibraltar is at the mercy of landlords, some of whom are non-resident, and appear to care very little about their property or its tenants. The interiors of the poorer class of houses are miserable in the extreme; the great evil being want of sufficient light and air. They are dirty, the walls mouldy, and the people wretched.

Many of the house rents would be considered most exorbitant in any town in Great Britain. This of course arises from the high demand for houses, but it proves that there are plenty of means of paying for any necessary improvements. If high rents are charged, the local authorities should at all events have power to see that the houses are kept in a healthy condition by their proprietors.

Generally the houses in the higher parts of the town are of a better character, they are built in single lines or are detached, with plenty of light and air about them, but they are all deficient in drainage and in domestic arrangements. As a whole we feel bound to state our opinion, that so far as their construction, cleanliness, and drainage are concerned, the description of the state of the houses during the last epidemic of yellow fever, we have quoted above, is by no means inapplicable to their present condition.

2. Drainage.—The drainage plan and sections, Plans XXII. and XXIII., appended to this report, show the present lines of sewers and drains. The system consists of four main lines commencing at the higher end of the town, and carried in as straight courses as the streets and inclinations will allow, directly through the works into the sea. Branches are led into these sewers from the streets along their course, and the house drains are connected with them. The sections are mostly square, and the sewers have, thus, flat instead of curved bottoms, and they pass through the works with a very slight inclination. The lower districts of the town are either drained to the same outlets, or where these are not convenient, separate outlets are carried across the breakwater to the open sea. One of the mains, as shown in the section, commences at a height of about 128

feet above high-water mark, and reaches that level after a sectional course of about 1,000 feet. Another commences at a height of 264 feet, and descends to the sea level after a course of about 1,500 feet, 500 feet of the lower end being nearly horizontal. A third has a fall of 264 feet in 2,200 feet. A fourth discharges its water into a nearly horizontal main, after a fall of 232 feet in 1,550 feet. The peculiarity of the system is, that the rain-fall on the surface of the town and on the roofs of the houses, together with the deluge of surface water which descends from the highly inclined slopes above, runs with extreme rapidity from all the higher levels into the lower and flatter districts, where it bursts the sewers, saturates the subsoil, and interferes with the efficient drainage of all the lower parts of the town.

As we shall presently see, there is no water supply except what is carried by hand, and the result is that although the sewers and drains are flushed out, more or less effectually, by heavy rains, most of the excreta of the population is retained in the sewers and drains in the interval between the rainy seasons; the drains become nothing but cesspits during the dry, warm, and unhealthy months of the year, and the entire drainage system is most offensive and unwholesome at such times.

The outlets are very bad; the sewage is carried in iron pipes across the shallow water intervening between the line wall and the breakwater, and is discharged outside; but during heavy rains the drains generally burst outside the line wall, and within the breakwater; the sewage finds its way in a diluted form into the shallow water, and there becoming decomposed in warm weather it gives rise to intolerable nuisance. Indeed in several cases an opening is purposely left in the drain outside the line wall to allow of overflow, which leads to the same result.

There is no sewer ventilation, and the foul air finds its way through badly-constructed untrapped gulley grates and privies into the streets and to the interior of the *patios* and houses.

However defective the existing drainage system may be, the main sewerage at present is very much better than the house drainage. Indeed, hardly anything could be worse than this is, and it will be a great mistake to expect superior health from any improvements in the main drainage unless a radical change be effected in the house drainage.

Every house appears to have a drain of some kind or other. It commences in the *patio* or court, by an open, untrapped, or badly-trapped orifice, through which the most offensive gases escape.

There are no water-closets, at least in the poor class of houses; there is one privy generally for the whole population of the court. It is merely an opening over a badly-constructed drain, without water, except what may be thrown into it by hand, and admitting the sewer air as well as nuisance from the place itself freely into the court.

The surface drainage of these courts is often very bad. Rubble stone is used for paving, and where there are flags they are often broken or uneven, allowing filth and foul water to lie on the surface, endangering the public health.

These very serious drainage defects have occupied the attention of the military authorities, and they propose to remedy them in the following manner:—

It has been proposed by the Commanding Royal Engineer to intercept the sewage from all the higher levels of the town, except a small district at the north end of the town, by an intercepting sewer 3,200 feet in length, commencing at the point where the level of the high-level sewer reaches the foot of Bell Lane, at an elevation of 20 feet 2 inches above high-water mark. From this point the sewer proceeds southward, following the line of the main street of Gibraltar; through the South bastion, and terminates at the Ragged Staff. The form of the sewer is egg-shaped, 2 feet 6 inches high at the commencement and 4 feet 6 inches at the outlet, where it is continued out beyond the end of the quay 250 feet from the shore. The sewer will be closed against the influx of sea water at high tide (which would back-water the outlet to a considerable distance), while it will permit of free discharge of sewage as the tide falls. There will be 6 feet of water over the sewer top at low water. The current setting round the bay will pass the mouth of the sewer, and carry the sewage into a large body of water, where it will become sufficiently diluted to be harmless. This intercepting sewer will turn aside from the low flat districts of the town very nearly the entire rain-fall of the surface of the higher part of the town, which at present flows into these low districts, and only the drainage of the lower districts will have to be carried in its present course through the line wall. The relation of this intercepting sewer to the existing drainage is shown on Plan XXIV.

The scheme is correct in principle, but it is intended only for the relief of the sewers of the lower districts from the sewage of that part of the town built on the slopes above. It does not contemplate cutting off the rain-fall of the higher hill slopes from the subsoil of the town, and yet this is an element absolutely essential to the public health. This higher water should be intercepted and turned away altogether from the town, and either conducted directly to the sea, or, as we shall propose presently, it should be collected as a water supply for the population.

If combined arrangements of drainage and water supply such as we contemplate be carried out, as they ought to be, they will lay the first foundation for a good drainage system for the garrison, by saving the low flat districts from the accumulated sewage and rain-fall of the higher; by diverting the rain-fall of the higher slopes and converting it into a source of water supply, and by diminishing very greatly, if they do not entirely remove, the nuisance at present occasioned by the deposit of sewage along the course of the breakwater.

As already stated, no sewer can be kept free of deposit in a place where there are several months in the year without rain-fall, and where the domestic water supply is so deficient. The new system of sewerage must therefore be accompanied by a special supply of water for latrines and waterclosets and for cleansing the sewers when necessary. Fresh water is not available, and salt water will answer the purpose. This may be obtained either by erecting a pumping engine near the Ragged Staff to throw water to elevated tanks, by means of a pipe carried up in the line of Charles V. wall, as proposed by the Commanding Royal Engineer, or (what would be better) by using the pumping engine already erected at the south, to raise water to reservoirs placed at sufficient heights above the sea, from which pipes would convey the water to the waterclosets and latrines of all houses and barracks, and also to flushing tanks at the head of the main lines of sewers to sweep out any deposit in dry weather. This last object is the only one aimed at in the scheme alluded to for flushing the drainage, but flushing will be of little use unless all the open privies are abolished, and water latrines or waterclosets substituted for them. When the improvements are completed, in place of the 11 outlets at present along the breakwater there will be five, which will drain only a small town area, together with the casemated barracks, and by carrying these outlets into deeper water there need be no nuisance from them.

It is very probable that most of the existing sewers will have to be reconstructed on account of errors in form. Those which we saw opened contained deposits and were very offensive. The intercepting sewer will remove part of the evil, and enable much smaller sewers to be introduced in the flat districts than the present ones; but unless this be done there will be some risk lest the very disproportionate size which the present sewers will have when the high drainage is cut off, should lead to greater accumulations in them. We therefore recommend that the whole of the lower districts and all the houses and courts should be drained by glazed pipes.

Another essential improvement required is the ventilation of the main sewers high up on the rock. Shafts erected over the highest points of the mains, of the same diameter, and carried 20 or 30 feet above the top of the highest houses, would become heated by the sun, and would have draught sufficient to keep a continual current down all the sewer openings, instead of the foul air coming up through the openings in streets and courts, as is the case at present.

3. Water Supply.—We have given in Appendix No. 6–7, the statistics of the water supply for the civil population, from which it appears that 179 houses, containing 2,775 inhabitants, have no water except what is carried to them; 133 houses, containing 2,320 persons, are supplied with bad or brackish water from wells dug in strata penetrated more or less with sea water and polluted with organic matter. Ten wine houses and taverns have similar bad water, and 136 houses, with 4,497 inhabitants, have cisterns or tanks yielding water for 10 months only in the year.

From all the sources together, the supply is something very different from what is considered requisite for health and comfort at home. The present consumption of the civil population of the garrison for all purposes is only from a gallon to a gallon and a half per head per diem.

The inadequate supply of water is greatly due to absolute deficiency of this prime element of health and cleanliness, partly to the cost of distribution. It is hardly too much to say that there is not a water pipe in the whole town except the old aqueduct. The garrison quartermaster states, (Appendix 6,) "that the inhabitants owe nothing "to the British Government for the small supply of water they have had for 150 years." They have had to supply themselves, and at a great cost too. He shows that the mere cost of carriage paid by fewer than 10,000 inhabitants (less than two-thirds of the civil population) amounts to a voluntary water rate of 2,500*l.* per annum.

The acting police magistrate (Appendix 7) states, the approximate quantity of water brought into the garrison by hand in 1860 at 2,243,580 gallons, at a cost of 3*l.* 19*s.* 1*d.* per house for the 853 houses included in the North district. If we take the mean of the two returns we find the present cost amounts to 3,000*l.* per annum for say a gallon and a half per head per diem on a town population of 13,898, or upwards of 4*s.* 3*d.* per head of the population per annum; or 8*s.* per 1,000 gallons. Each *person* in Gibraltar thus pays about as much per annum for 1½ gallons of water a day, carried by hand, as a whole household in our improved towns pays in England for an unlimited supply laid on by pipes.* This simple fact is enough to show that there is a rate-paying power quite sufficient, to say the least of it, to enable the present utterly defective system to be put an end to, and a water supply by gravitation to be provided for every house in the garrison.

These general remarks on the water supply of the town apply to that for barracks.

The tanks and wells for supplying water to barracks and hospitals are by no means sufficient for the purpose, and a considerable amount of water is carried daily to the different barracks from the well on the Neutral Ground and from other sources of supply within the lines. The average annual cost of carriage varies in different years, but an average of five years gives a charge on the public of 500*l.* per annum, which is paid to a contractor (Appendix No. 6). This annual outlay, though smaller in proportion than that incurred by the civil population, nevertheless represents a capital which would go a considerable way in supplying the necessary amount of water for troops by gravitation.

There is no water laid on for any one purpose, either for cleanliness, washing, cooking, drainage, latrines, or water-closets. Most of the barrack wells are not safe for drinking or culinary purposes. Many of them contain water offensive to the taste. The tanks, although containing better water, are underground, and often placed in dangerous proximity to drains and other nuisances; or they are supplied with rain water from surfaces covered with impurities. There is hardly a barrack into which some part of the water supply has not to be carried, in barrels on carts, or by fatigue parties, and the men are limited by regulation to about one third the quantity found to be necessary in this country for health and cleanliness.

The military population is at all times on a water allowance just as if the garrison were in a state of siege. The allowance is stated in Appendix No. 8, and is utterly incommensurate to the soldiers' wants in such a climate, either for comfort, cleanliness, or health.

The following table gives the present scale :—

Commanding officer -	7 gallons each a day.	Horses - - - -	6 gallons each a day.
Non-commissioned officers, rank, and file - -	2½ ,, ,,	Officers' mess - -	100 ,, ,,
Women - - - -	2½ ,, ,,	Serjeants' mess - -	14 ,, ,,
Children - - -	1 ,, ,,	School-room - - -	8 ,, ,,
Civil servants - -	2 ,, ,,	Dispensary - - -	8 ,, ,,

The commanding officer's allowance in this scale is the one which is found to be necessary for every head, including children, of the civil population at home.

The quantity of water at present available within the fortress is thus totally inadequate to the wants of the troops and population

The only natural water source for Gibraltar is the rain-fall. The rain which falls on the slopes of the rock descends in immense quantities to saturate the red earth on which the town is built, whence it is drawn by wells; and by a natural system of percolation through a large mass of debris at the south end of the town where the Alameda is situated. Rain water from roofs and from the surface of the rock is stored in underground tanks.

From the bad state of the drainage in time past, it may be doubted whether a single well, especially in the lower part of the town, yields wholesome water.

The water from the Alameda is conducted in an underground aqueduct along the lower level of the town, and is used for supplying public fountains. This work is said to have been executed by an Italian during the time of the Spanish occupation. The principle adopted is an extremely simple one. The mass of sand at the Alameda receives the accumulated rain-fall of the slopes above, and acts as a natural reservoir and filter, from which the water is collected by ducts to a central reservoir, and is thence conveyed by a conduit, partly of masonry, partly of earthenware pipes, to the fountains. The flow is continuous, and the method of distribution is as ingenious as the means of collection. At the time of our inspection at the end of the dry season the supply appeared to be of the usual amount.

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* For example, the population of Alnwick, 7,000 in number, has a constant water supply of 120,000 gallons a day, and the annual water rate is about 8*d.* in the pound. A 4*l.* cottage pays 2*s.* 8*d.* a year, and a 10*l.* house 6*s.* 8*d.* per annum. The usual cottage water rate in small towns supplied by water companies is 5*s.* a year.

The supply appears to have been sufficient for the garrison of that day, and was conducted close to the barracks and houses within the town. But at present the greater part of the population is considerably above the level of these fountains, and the water has to be carried up to the houses by manual labour. The quantity yielded by the aqueduct is besides only a fractional part of what is required for the garrison. It has been proposed to increase the quantity by directing a larger amount of rain-fall into the mass of sand, and by stopping up some of the outlets through which it escapes to the sea. This plan, which has been in successful use for centuries in Gibraltar, was one of the methods suggested by the General Board of Health for the water supply of the metropolis.

In the Appendix No. 4, will be found lists of all the tanks and wells, military, naval, and civil, within the garrison. They receive water partly from the surface, partly from subsoil infiltration, and partly from roofs. The aggregate tank capacity, if correctly given, represents a storage of about 6,000,000 gallons for the civil population. Every new house erected must have a tank to store the rain water falling on the house, so that the amount of storage is gradually increasing. The existing military and naval tanks have a capacity of nearly 3,000,000 of gallons, to which tanks to hold 1,600,000 gallons are in course of being added by the military authorities, and for 2,000,000 gallons by the naval authorities. Of these new military tanks, one for 1,500,000 gallons is at the Moorish Castle above the town. The naval tank is at a considerable elevation, and both tanks would distribute water by gravitation over the whole town and to most of the barracks. Many of the existing tanks are in such positions as to be exposed to impurities from the surface or from the subsoil; and none of them appear to have any means of filtering the water before it enters them, although filtration is absolutely indispensable wherever water is collected in this way.

A number of barracks and quarters are partly supplied from wells, draining a very suspicious sandy subsoil more or less charged with noxious impurities.

Another and a very important source of water for the garrison is a well already mentioned on the Neutral Ground outside the lines, from which there is a constant traffic in water carried on to the barracks and houses. But this water source cannot be trusted to, as it would be cut off in the event of a siege.

With the view of determining the present quality of the water, and the direction in which the supply should be extended, we had specimens sent home for analysis from all the main sources, namely, the Neutral Ground well, the old aqueduct, tank water, and well water taken from the flat part of the town. The results are given in a report in Appendix No. 5, by Mr. Abel, which shows the great advantage of submitting water sources to this kind of examination. The following table gives the composition of each water in grains per gallon :—

—	Neutral Ground Well.	Aqueduct Water.	Tank Water.	Town Well Water.
Sulphate of lime	4·56	12·49	1·55	15·16
Nitrate „	6·22	16·01	0·83	49·63
Carbonate „	12·24	17·04	0·94	—
Carbonate of magnesia	5·67	15·27	36·33	10·98
Nitrate „	—	—	—	7·11
Alcaline chlorides, (sodium and potassium)	7·48	28·59	3·59	80·24
Organic matter	4·06	9·94	5·02	7·70
Ammonia	slight trace.	slight trace.	trace	slight trace.
Total	40·23	99·34	48·26	170·82

The chemical constitution of these waters is extraordinary, both as regards the amount and character of their impurities, when compared with what are considered waters sufficiently pure for town use. Compare for example the solid contents per gallon of any of them with the amount in the water supplied to Glasgow, which has only 2·35 grains of solid matter per gallon. The Gibraltar waters contain an extraordinary quantity of nitrates, one of them not much less than an eighth part of an ounce to every gallon.

The amount of organic matter is excessive, and there is also an excessive amount of chlorides. The sources of these various impurities differ in the different waters. The well water and aqueduct water must derive their nitrates and organic matter by infiltration from a subsoil saturated with sewage.

The chlorides in the wells indicate the presence of sea water. In the tank water they probably arise from spray. It is less easy to account for the quantity of chlorides in the aqueduct water unless we suppose that the soil from which the water proceeds contains chlorides.

The inorganic impurities of the tank water probably arise from the geological structure of the rock, or from the building materials: the organic matter is washed in by the rain, but in a properly-constructed tank the organic matter would be of vegetable and not of animal origin, and it could be prevented from entering the tanks by filtration.

The results of the analysis clearly indicate which waters should be disused, and from what source the future extended supply should be obtained.

Wells situated in the flat district of the town are quite unfit for use. The aqueduct water, although largely consumed both by troops and civilians, would not in its present state be a safe water for use during an epidemic. The neutral ground water is not good. By far the best, although somewhat hard, is the tank water. The source from which it is derived is the least objectionable, and ought to be chosen for extending the supply.

In carrying out this principle of supply we recommend that a large catch-water drain, of sufficient depth to collect the largest rain-fall, on the lofty slopes above the town, and cemented most carefully, should be formed in the rock just above the town, and carried from the Moorish Castle to Windmill Hill. It should be currented to supply the various tanks we are about to name, either directly or by large iron pipes leading from the catch-water to the tank.

The upper portion of the rock, from which the water would be obtained, apparently contains four areas, from each of which the water could be conveyed into tanks. These areas are marked A, B, C, and D on the sketch Plan XXI.

The area marked A would supply the tank for 1,500,000 gallons now in progress at the Moorish Castle. The area marked B would supply a new tank. The area marked C might be appropriated to the supply of the naval tank recently constructed. The area marked D would supply a new tank.

Flagged branch drains should be carried up the slopes to convey the surface water rapidly to the catch-water. Useless vegetation should also be removed from the surface where the water is collected.

We have shown on the sketch Plan XXI. the portions of rock this catch-water would drain. Besides being necessary for collecting water, the catch-water drain is essential to prevent the rain-fall from saturating the subsoil of the town. It should be constructed at once. It will be seen that below the level of the drain, and between it and the town, there are portions of the upper part of the rock from which the drain could not intercept the rain-fall. The water from these slopes should be at once cut off from the subsoil of the town by a deep drain, and conducted to a main sewer. Overflows into the town drains, and where not over the town, direct to the sea, should be provided, for all water which the tanks cannot contain.

The steepness of the rock and the hard material of which it is composed would render the construction of tanks at an elevation as a rule difficult and costly. His Excellency Sir William Codrington suggested a large gully at Buena Vista as a good locality for a large tank. The bottom of the gully is above the level of the majority of houses in the town. The examination we made of the locality leads us to believe that water could be led to it from the areas B and D above mentioned. If upon a further examination of the levels and the locality the accuracy of this view should be established, and the size should prove sufficient, the gully in question would appear to offer an economical and advantageous site for a tank to stow the whole of the additional supply required. The saving in first construction which would result from the adoption of this arrangement would compensate for any expense which might be occasioned from the necessity of pumping a small portion of the supply to higher levels, such as Windmill Hill.

The rain-fall from the area marked B would be brought by a line of iron pipes commencing either at the south demi-bastion or at Charles V. wall, and following generally the line indicated on the plan.

Considering the peculiarities of the rain-fall of Gibraltar, it would be desirable to make provision for removing a fall of rain of not less than one inch per hour, of which it may be assumed that one-half will at once pass off into the catch-water. Taking the north area at about 60 acres, this would require a pipe of three feet diameter, with an inclination to give a velocity of not less than five feet per second.

The whole of the details of the arrangement would require careful consideration on the spot. Before flowing into the storage tanks, the water should be passed through filtering tanks, of the construction shown on Figs. 1 and 2, to prevent impurities from entering the storage tanks. The main tanks should be covered to prevent vegetation in the water, but the covering might be of such light materials as might be found most economical. From the tanks pipes would convey the water over the rock.

The area from which the catch-water drains will intercept water is above 130 acres in extent. The steepness of the surface is favourable to the water flowing off rapidly; but, on the other hand, the surface is intersected by crevices containing earth and vegetation, which would absorb a certain amount of the water. The rate at which rain falls in Gibraltar is frequently so great that a large part of it would be collected in proportion to the amount lost by evaporation or absorption. Under these circumstances we consider it safe to assume, except in peculiarly dry years, 30,000,000 gallons for the supply from this area. Gibraltar town is said to contain about 14,000 inhabitants, the garrison would, we are informed, be reckoned at 7,000 in time of war, so that provision must be made for 21,000 persons. The amount of water which could be furnished by the rain-fall will not suffice for all purposes, including waterclosets and flushing drains. We, therefore, consider that for such purposes it is essential that a brackish or sea-water supply be obtained; this has already been proposed and adopted for some of the barracks. Sea water, if it can possibly be avoided, should not be used for washing or watering the streets or yards; it dries very imperfectly, and, when in contact with organic matter, it readily enters into decomposition. The water (obtained either direct from the sea, or from a well near the sea, so as to have it as free from salts as possible,) would have to be pumped up into tanks placed above the town and on other parts of the rock where required. Iron tanks would probably be least expensive. Two tanks of 10,000 gallons each for the town, and two in convenient localities for the south, Windmill Hill and Europa, would suffice. The water should be generally distributed and laid on to waterclosets and latrines in every house and barrack, so as to afford the means of washing out all the drains. The engine which has already been erected in the south district is calculated to raise 30,000 gallons daily to the height of 250 feet, an amount probably sufficient for the purpose, but a second engine would be required to provide against accidents. To preserve the health of the troops during a siege, the arrangement should of course be as available then as in times of peace, hence it is necessary that the engine should be placed in a bomb-proof building and beyond the reach of direct fire; it might therefore be necessary to remove it from its present position. This, however, would be a matter for the consideration of the Governor and commanding Royal Engineer.

Provided this arrangement be adopted, we think that from four to five gallons of fresh water per head for the population and garrison may be assumed to suffice for all purposes, except for waterclosets and drainage, although no doubt a larger supply would be preferable. The population of 23,000 would require on the higher estimate about 33,700,000 gallons per annum, of which an eight months' supply, or say 22,500,000, gallons would require to be stored to last during the months when there is little or no rain. Of this it would appear, from the information with which we are furnished, that—

The civil population have tanks to contain - -	6,000,000 gallons.
The military to contain - - - - -	3,000,000 ,,
The military authorities have tanks projected or in execution to contain - - - -	1,600,000 ,,
Total - -	10,600,000 gallons.

The naval tanks for 2,000,000 gallons are not included in this estimate.

The private tankage of the civil population, amounting to 6,000,000 gallons, will contain about one gallon per day per head of that population. We therefore consider that for the present it will suffice to provide the civil population with an additional supply of three gallons per head from the public tanks, which amount might be increased at a future time, as additional tanks are constructed. Upon this basis the additional storage room for water which is required is for about 13,000,000 gallons. An attentive study of the various sites in which tanks could be constructed has led us to the opinion that the site suggested by his Excellency Sir W. Codrington in the gully at Buena Vista and a plateau behind Windmill Hill Barracks would be the most eligible sites for these additional tanks, as they would be sufficiently elevated to distribute the water to a considerable area by gravitation. The few special localities above the levels of the tanks would be more economically supplied by pumping than by the construction of large storage tanks at the necessary elevation. A detailed survey will be required to ascertain whether the Buena Vista gully contains the space necessary for storing the additional supply.

These large tanks in elevated positions must be constructed by degrees, and thus an opportunity will be afforded of ascertaining what are the limits of the water supply and the demand of the population. Loss of water by holes and crevices can be diminished or prevented by turning the rain-fall away from them by small catch-water drains. But if the loss were found to be very considerable from general porosity of surface, which is unlikely, the only thing to do would be to flag as much of the surface as necessary. A flagged surface would yield from two to three times the amount of water which an unflagged surface would yield. The object to be aimed at is to obtain at least four or five gallons a head per day of soft water for the entire population and garrison. For flushing drains, and for supplying waterclosets and latrines, sea-water, thrown up by a steam engine, will be available. The soft water should be delivered daily by pipes into house cisterns of dimensions sufficient to contain a daily supply for each house, to be paid for by a general rate. A police inspection of the cisterns would be necessary to check waste and to see that the cisterns were kept clean and in good repair. Salt water for latrines and waterclosets should be laid on throughout the town, but no house cisterns would be required for it. Central tanks placed at convenient positions above the town, and above the south district, from which this water could be laid on by gravitation to each house, would be sufficient. A rate would have to be levied to pay the cost. In apportioning the cost, Government would of course be rated for the supply of its establishments.

4. Paving.—The public paving and surface drainage are generally good. In a number of streets or parts of streets stone is used, and in other parts the surface is macadamized. All the roads are of the latter construction and are kept in good repair; but they are very dusty in dry weather. The main defects in paving and surface drainage which came under our observation are those already mentioned in courts and passages within houses. Nothing can well be worse than are some of these. There are some vacant spaces of ground also, which are private property, and are not kept in good order. Over all such places the Commissioners should have direct control, as local Boards of Health have at home.

5. Cleansing.—The whole of the town refuse is at present collected daily by the scavenging department and removed to the sea beach on the east side of the neutral ground, to a sufficient distance from the garrison.

The public slaughtering places are also in the same locality, and the offal is deposited on the shore. No nuisance arises to the garrison from the present practice.

Summary.—The following is a summary of the sanitary defects of the town:—

1. Bad construction of dwelling houses, interfering with light and ventilation. Dampness of many houses on account of position.
2. Defective public drainage.
3. Private drainage very bad, or none.
4. Surface drainage, paving, and sometimes cleansing of private courts and passages, very bad.
5. Filth inside houses. Filthy unwashed walls and ceilings.
6. No proper soil-pans or other suitable domestic conveniences. Present arrangements most offensive and dangerous to the public health of the garrison.
7. Water supply bad, deficient, and costly.

There is no remedy for this state of things at present, so far as concerns the houses, for the authorities have no power except over the cleansing of the courts. It is a matter of absolute necessity for the safety of the town that powers of entry on all premises should be granted, and of compelling drainage, flagging, water supply, the construction of proper soil-pans or latrines supplied with water, in addition to the cleansing of houses, before any real sanitary improvement can be effected. Powers similar to those in the Public Health Act would suit the purpose, and should be applied by Order in Council.

The present sanitary powers are lodged in a body of Commissioners and Surveyors of highways, named by the Governor. Their duties are given in the Commission (Appendix 9). They relate chiefly to paving, repairing, lighting, and cleansing of public streets and other *public places*, and making and repairing public sewers and drains. The expenses are provided for by rates known as the "paving and scavenger's rate" and the "rate for lighting," levied by another Commission. This rating Commission is also appointed by the Governor, under an Order in Council (Appendix 10)

The powers, such as they are, belong to a state of sanitary legislation which has been found altogether insufficient for protecting the public health, especially in overcrowded districts, and it is absolutely necessary that the additional powers alluded to above, and for levying private improvement rates, should be granted.

To remedy these defects, and to provide for the better health of the garrison, we recommend,—

1. That an Order in Council be issued to enable the Governor to extend the powers of the local Commissioners over private courts, passages, and dwelling houses: to compel drainage, paving, and household water supply (soft water for domestic use and salt or brackish water for waterclosets and latrines), the limewashing and cleansing of filthy houses, to provide waterclosets or water latrines, and to levy private improvement rates, besides rates for public purposes. All plans of houses, to be built in future, to be referred for sanction to the same Commissioners.

2. That to improve the town drainage an intercepting catch-water drain of ample dimensions, carefully cemented, be cut in the rock from above the Moorish Castle to Windmill Hill, to prevent the water which falls on the upper part of the rock from passing into the inhabited areas below.

That so much of this water as is not stored for a fresh-water supply be carried direct to the sea through the town or other drains.

That the intercepting sewer proposed by the commanding Royal Engineer, for preventing the sewage of the upper districts of the town from passing into the lower districts, be constructed with an outfall at the Ragged Staff, as shown in Plan XXIV.

That the main sewers be reconstructed, and glazed pipe drains introduced for the smaller drainage where practicable.

That all sewers which come from the upper part of the town be ventilated by their upper ends being carried into shafts raised to 20 to 30 feet at least above the level of the highest neighbouring houses.

That the drainage of the lower part of the town and of the barracks adjacent to the line wall be carried direct to the sea.

3. That the water supply be extended by providing sufficient tank space to hold the water collected by the catch-water drain already mentioned, except during exceptionally wet years. That for drainage purposes a supply of salt or brackish water be provided by pumping into tanks and distributing it especially for this object. The soft water to be separately distributed for other domestic purposes.

Lastly. We consider it necessary that a medical officer of health should be specially charged with attending to the sanitary condition of the garrison, including the civil population: reporting all defects to the Governor in terms of the New Medical Regulations.

SECTION II.—SANITARY STATE OF THE TROOPS.

1.—Diseases among Troops in Garrison.

All the information we require as to the past sanitary state of the troops at Gibraltar is contained in the reports on Sickness and Mortality in the Army, prepared by Sir Alexander Tulloch and Dr. Balfour, extending from the year 1818 to the present time. From their reports we learn that for the group of years 1818-36 the annual admissions to hospital per 1,000 strength were 996, and the deaths per 1,000 were 21·4. The chief fatal diseases were fevers, the annual mortality from which amounted to 9·3 per 1,000; chest diseases, which yielded a mortality of 5·3 per 1,000, and cholera, from which the mortality was 2·3 per 1,000. The following abstract gives the nature of the fevers, with the number of admissions and deaths from each form for the entire period:—

Fevers, 1818–36.	Total admissions.	Total deaths.	Fevers, 1818–36.	Total admissions.	Total deaths.
Quotidian intermittent	174	5	Synochus	517	13
Tertian „	124	—	Typhus	30	10
Remittent fever	314	28	Yellow fever epidemic	1,522	423
Common continued	7,002	83	non-epidemic	4	1

This table, interpreted by the light of our present knowledge, shows the influence of bad water, of drainage both bad in character and deficient in extent, of overcrowding, and bad ventilation of barracks.

The table includes the epidemic yellow fever of 1828, which first appeared in the most overcrowded and filthiest part of the town, and then spread all over the rock; those only escaping who took timely refuge on the neutral ground.

The cholera epidemic of 1834, first appeared among the troops in King's Bastion, the worst barrack in the garrison. The troops in the crowded unventilated wings of the South barracks also suffered severely on that occasion.

The next group of years given in the reports is from 1837 to 1846, during which the annual admissions were 939, and the annual deaths 13·6 per 1,000, showing a very considerable reduction in the mortality. During these years some improvements had been carried out in drainage. The ventilation of casemates had been improved, some stone floors boarded, and improved means of personal cleanliness supplied.

The admissions from fever had fallen from 161 to 81 per 1,000, and the fever deaths from 9·3 to 1·96 per 1,000. The reduction in the total mortality was almost entirely due to diminution of fever and the absence of fever epidemics. The mortality from chest diseases was about the same as during the previous group of years. The following table shows the nature of the fevers:—

Fevers, 1837–46, 10 years.	Total admissions.	Total deaths.	Fevers, 1837–46, 10 years.	Total admissions.	Total deaths.
Quotidian intermittent -	130	—	Remittent fever - -	15	3
Tertian „ -	7	—	Common continued fever	2,444	41
Quartan „ -	6	—	Typhus - - -	56	21

There are no means of comparing the sanitary state of the troops from 1847 to 1858. But the first annual report of the Army Medical Department gives the following result for the year 1859. During that year the admissions to hospital were in the ratio of 949, and the deaths 7·76 per 1,000 strength. The causes of mortality are given in Appendix No. 11, which shows that 50 per cent. of the mortality arose from miasmatic diseases.

The nature of the fevers is given in the following table:—

Fever, 1859.	Total admissions.	Total deaths.
Intermittent - - - -	15	—
Typhus - - - -	2	—
Continued - - - -	552	15

It is evident from an examination of these data that the important diseases at Gibraltar are those of the miasmatic order, especially fevers, and also tubercular diseases; the following table, taken from the Army Medical Report, 1859, shows a material increase in the mortality from fever, as compared with the years 1837–46.

	1859.		Annual ratio per 1,000.			
			1859.		1837–46.	
	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
Eruptive fevers - - -	19	1	3·68	·19	1·63	—
Paroxysmal fevers - - -	15	—	2·91	—	5·85	·09
Continued fevers - - -	554	15	107·51	2·91	75·46	1·87
Dysentery, diarrhœa, and cholera -	389	4	75·49	·78	145·	1·18
Sore throats - - -	89	—	17·27	—	14·82	—
Ophthalmia - - -	255	—	49·48	—	70·54	—
Rheumatism - - -	143	—	27·75	—	41·26	·06

The fever of 1859 appears to have been specially connected with overcrowding and bad ventilation, for it increased in proportion to the increased strength of the garrison; other local causes remaining the same.

We have attempted to obtain the statistics of individual barracks, but without success, on account of the frequent changes and varying occupation to which they are subject. The only data we have been able to obtain are from a table supplied to us by Deputy Inspector-General Paynter, giving the statistics of an attack of cholera which occurred in the year 1860, showing that the intensity of the disease in the barracks was in the following order, beginning with the one most severely affected:—Grand Casemates, South Barracks, Windmill Hill, Buena Vista, Europa, and Rosia.

The statistical data show that the troops suffer from the same classes of disease and from the same general causes of unhealthiness as the civil population.

2.—LOCAL POSITION OF BARRACKS.

We next proceed to consider the general sanitary condition of the barracks and hospital, reserving the details of each building to the subsequent part of the report.

The following is a list of the barracks on the rock, together with the regulation number of men in each, and the number which each barrack ought to contain:—

North District.	Regulation Number of Men in each Barrack.	Number which each Barrack should contain.	South District.	Regulation Number of Men in each Barrack.	Number which each Barrack should contain.
1. Grand Casemates -	1,166	710	10. Jumpers Bastion -	192	120
2. Orange Bastion -	160	80	11. Rosia Casemates -	72	36
3. Prince Albert's Front -	114	79	12. South Barracks -	696	480
4. King's Bastion - -	256	128	13. Rosia Barracks -	549	494
5. Wellington Front -	533	393	14. Buena Vista Barracks -	416	320
6. Moorish Castle - -	80	54	15. Windmill Hill Barrack -	402	170
7. Gunners Barrack -	24	20	,, Artillery -	22	22
8. Town Range - -	320	192	16. Europa Defensible Barrack	100	92
9. Hargreaves Barrack -	131	94	17. Brewery Barracks -	110	85
			18. Europa Huts - -	384	384
			Total - -	5,727	3,953

The positions occupied by these barracks vary most materially as regards their sanitary relations. The first five barracks in the north district, and the first two in the south district are on sites very little raised above the sea level. Several of them are almost on that level, and the floors and barrack yards are more or less damp at all times, but especially during the prevalence of the rains. Orange Bastion, Prince Albert's Front, King's Bastion, Wellington Front, Jumpers Bastion, and Rosia Casemates are within the line wall, which retains such part of the filth, drainage, and rain-fall in the subsoil as cannot escape by the sewers. From their local position free external ventilation is next to impossible with these barracks. They generally open out of narrow courts surrounded by high walls, or they are over-topped by the houses of the civil population, or there is a high wall a few feet from the doors and windows in front. With few exceptions the rooms have no openings except at one end, and altogether the line wall casemates are among the worst we have anywhere seen as regards their local position. That they are not more unhealthy is attributable to the fact that they have the advantage of the surrounding sea air. Their position is of course unavoidable, but much may be done to render it less unfavourable to health than it is at present.

Barracks, such as the Town Range and Gunners barracks, situated among the houses of the town, are exposed to the same stagnation of air and bad drainage as the houses are.

Barracks situated on the higher levels ought all to be healthy, so far as local position is concerned. They are removed from every unavoidable source of impurity, and any local unhealthiness experienced in them is due to a bad use having been made of the ground, such, for example, as placing the barrack too close to the rock, bad construction, or to some removeable defect.

In low-lying, imperfectly-drained, close situations there are barracks for 2,493 men, where there is available space for only 1,546 men; among the houses of Gibraltar there are barracks for 344 men, with sufficient space for no more than 212 men; and on healthy positions of greater or less elevation there is accommodation for 2,890 men, where only 2,195 ought to be placed.

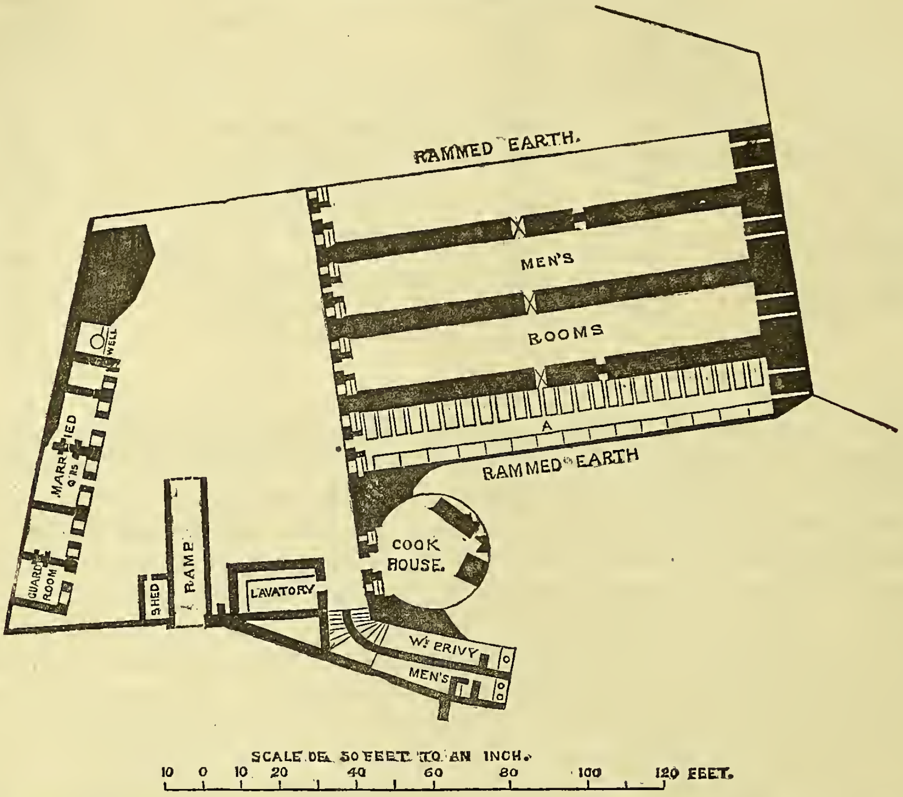
3.—Construction of Barracks.

More than half the garrison is lodged in casemated buildings, and all the barracks in unhealthy situations are casemates. Three blocks of building, the Grand Casemates, Buena Vista, and Europa Defensible barrack, are detached from the works, and have doors and windows at opposite ends. All the other casemates are in bastions or curtains, and consist of arches, the axes of which are at right angles to the line of the wall. These have doors and windows only at one end, and at the other end there is a blank wall in the majority of cases. In some rooms there are small loopholes 5 or 6 feet from the ground, or a small shaft has been carried up in the back wall to afford some degree of ventilation; but the rooms are nevertheless mere receptacles of foul air, dark, damp, and unwholesome.

One or two illustrations of their construction will show the influences to which the men are exposed in these casemates.

Fig. 3 gives a plan of the casemates in Orange Bastion, a work not of recent date. These casemates are much below the surrounding levels, and are ventilated only from a small, confined, ill-paved and damp court in front. There is no possibility of obtaining a thorough draught of air, and they are so crowded that the beds, as shown in the sketch, nearly touch each other along the wall on one side, while they actually touch each other along the opposite wall. It is quite evident that the probable effect on health of this form of construction never received a moment's consideration.

Fig. 3.—Orange Bastion Casemates.

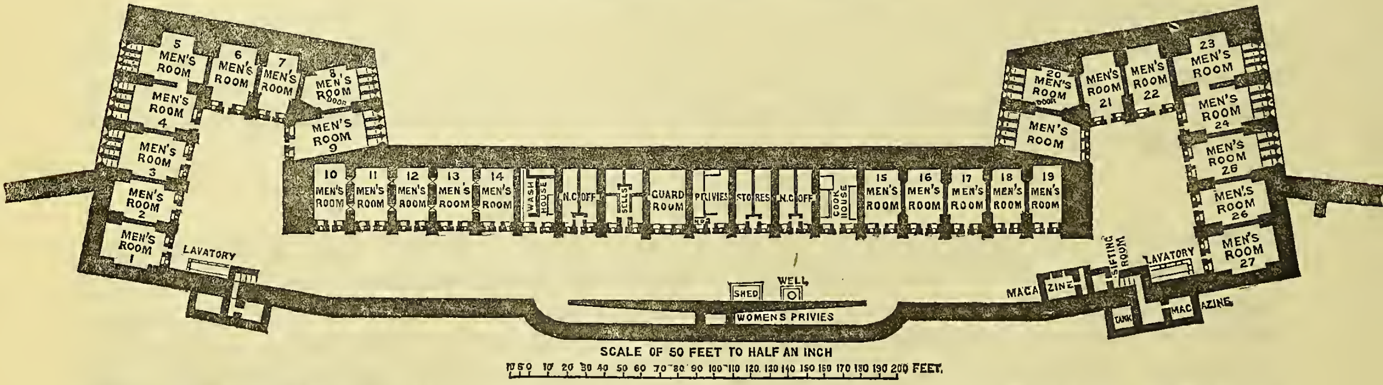


Note.—The part marked A shows the number and arrangement of the cots in each room (40 men). The width of the rooms is 14 feet, and the length 105 feet.

A plan of Wellington Front casemates is shown in Fig. 4. This is a recent work, and is the best of its class in Gibraltar. There is, however, the same sunk area, with the impermeable wall outside, and the ventilation coming only from the sunk court in the great majority of rooms.

But the casemates are much shorter than in the other example, Fig. 3. In a number of rooms there are loopholes to the sea, which although too small to be of much use are better than a blank wall, and there are air shafts for ventilation not shown in the figure.

Fig. 4.—Wellington Front Casemates.

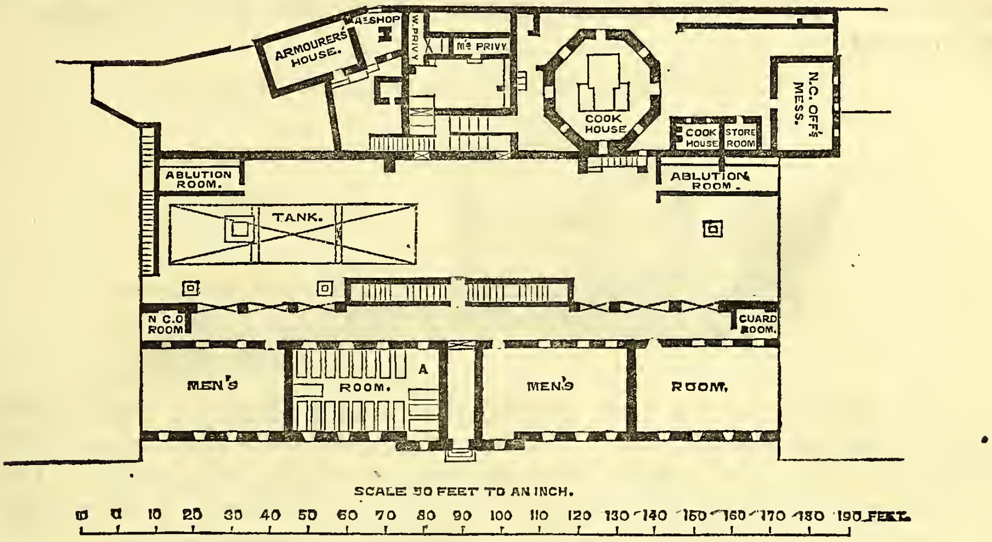


Note.—The walls between Nos. 1 and 9, and 15 to 17 are carried up to the spring of the arch, leaving space for ventilation between the spring and crown of the arch of one room into another room, also inhabited.

The floors of all the casemates are of stone, at or below the level of the ground, and they are all more or less damp. The floors should be raised on walls with free ventilation beneath, and they should be boarded over.

Barracks, not of casemated construction, differ in their arrangements. We have selected two of these as illustrations. The first is a part of Town Range barrack shown in Fig. 5. The only level ground about this barrack is a narrow street in front, and the narrow court yard behind. All the outbuildings shown in the sketch are on higher ground, and the rock rises with a very steep inclination to a great height behind. Offensive gulley grates open into the court yard close to the barracks. The rooms have a great advantage as regards health in having windows on both sides, but they are greatly overcrowded, as is shown on the sketch, by the position of the beds. The situation is close and badly ventilated, as well as badly drained, and this barrack has yielded numerous fever cases.

Fig. 5.—Town Range (Left Wing).

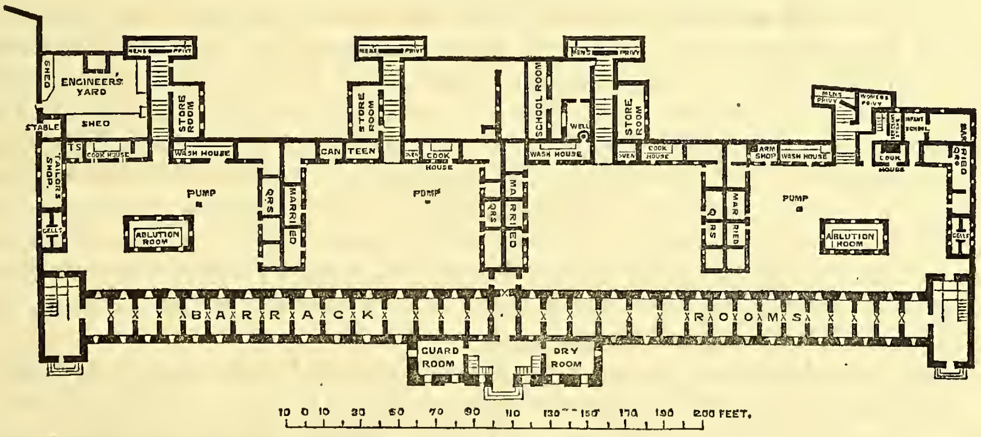


Note.—The part marked A shows the number and arrangement of cots in each room for 20 men.

The locality is not one in which a large number of men should be barracked together, but still it may be rendered much more healthy by better drainage and ventilation, by putting an end to overcrowding, and by providing wooden floors instead of stone for the lower-story rooms. At the time we were in the rooms the stone floors were soaked with wet.

The next illustration (Fig. 6) is a ground floor plan of South barracks, a large building occupying a healthy position, and nevertheless yielding a considerable per-centage of fever cases among its occupants. It is fully exposed to the sea along the front, and there is a wide court yard between the back and the rock. But this court yard has been rendered almost useless for the ventilation of the lower floor by being in the first place closed at the ends by other buildings, and by having three lines of married quarters built across it like traverses, as if to prevent the air from circulating. The construction of the rooms is extraordinary. They are partially divided by piers and arches, the effect of which is that each wall obstructs the circulation of air, while there is a community of foul air throughout the building, partly by the arches, partly through the floors. There is no ventilation except the windows are kept open, and there is very considerable overcrowding. The ground floors are below the level of the court yard behind, and have no circulation of air beneath them, instead of being a foot at least above the ground, with ventilation beneath ; and they are of stone instead of wood.

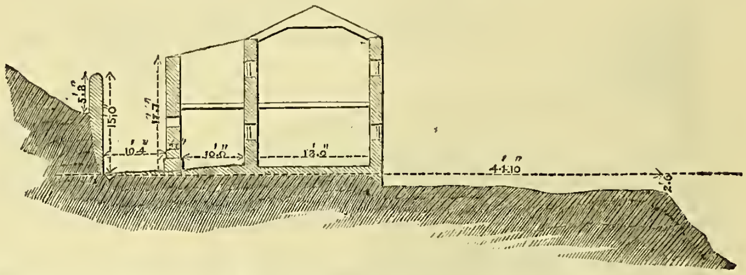
Fig. 6.—South Barracks.



In this instance the defects in construction, want of ventilation, and overcrowding, are quite sufficient to account for the fact that if any epidemic disease is about, the troops in these barracks are tolerably certain not to escape it.

Windmill Hill barracks, although occupying a very healthy site, are badly constructed. They are deficient in window space and have their verandah placed on the north side, where there is no sun, while the south side is quite unprotected. They are, moreover, placed as close to the lofty rock behind as they could well have been, and the ventilation is much obstructed by these errors of construction. Fig. 7 shows the position of this barrack with regard to the rock, its verandah on the wrong side, and the probable effect of both errors in preventing that free ventilation required where a number of men are massed together.

Fig. 7.—Section through Windmill Hill Barracks.



The best barracks on the rock are the new huts at Europa, which embody correct principles of sanitary construction. We have described them elsewhere. With a few improvements in detail they would leave little to desire as regards health. The materials used are limestone, quarried from the rock, lime, and timber. They occupy a plateau freely exposed to the sea-breeze, and afford sufficient space for the men.

There are a number of very bad and ruinous Crimean wooden huts on the neutral ground, and on Windmill Hill, occupied by troops and as married quarters, which ought to be pulled down as soon as better accommodation can be provided.

These examples will give a general idea of the nature of the barrack accommodation, the details of which will be more fully given in the subsequent section of this report.

4.—Cubic Space and Superficial Area per Man in Barrack Rooms.

The table, Appendix No. 12, gives the number of men in every barrack for every 50 cubic feet, and for every 10 superficial feet, from 250 to above 600 cubic feet, and from 20 to above 60 superficial feet per man.

The following abstract contains the results:—

Cubic Feet.							Superficial Feet.				
250 to 300.	350 to 400.	400 to 450.	450 to 500.	500 to 550.	550 to 600.	Above 600.	20 to 30.	30 to 40.	40 to 50.	50 to 60.	Above 60.
No. of Men.	No. of Men.	No. of Men.	No. of Men.	No. of Men.	No. of Men.	No. of Men.	No. of Men.	No. of Men.	No. of Men.	No. of Men.	No. of Men.
402	927	2,288	632	843	572	63	446	4,807	440	22	12

This table shows a great degree of overcrowding in most of the barrack rooms in the garrison. It appears from it that no more than one-tenth of the men have the amount of space allotted by regulation to troops at home stations; the remaining nine-tenths all occupy overcrowded barrack rooms, and for one half of the men the crowding is excessive. This prime agent in the production of continued and typhoid fevers therefore, exists within the garrison, and to such an extent that nothing short of increasing the barrack accommodation, or diminishing the number of troops will diminish materially their liability to febrile disease. The question of overcrowding involves the most difficult of all the sanitary problems relating to this garrison. The space for barracks is limited, and considerable bodies of troops have to be located within very circumscribed areas. But, notwithstanding this, the barrack accommodation admits of being gradually extended to afford healthy space for the men.

The amount of cubic space per man must be determined with regard to local circumstances. The fact of the rock being nearly surrounded by the sea, and fully exposed to the sea-breeze, is a great element of health. It is this, indeed, which gives such comparative immunity from epidemic disease under the very unfavourable sanitary conditions which the garrison presents. For all positions, except along the line wall, 600 cubic feet per man would probably be sufficient. As regards the line wall casemates, the only remark we have to make is, that the fewer men placed in them the better, and that Orange Bastion and King's Bastion are scarcely fit for human habitation. The casemates, in short, should be as little used as possible, except for emergency.

In a preceding page we have given a list of all the barracks on the rock, together with the number of men accommodated in each by existing regulation, and also the numbers which each barrack ought to contain. The estimate of accommodation we have there given for the casemated barracks is based on their local position and on the nature of the sanitary defects, removeable as well as irremoveable, presented by each barrack. In the better class of buildings we have assumed 600 cubic feet per man as the amount of space required for health. The total regulation accommodation is at present that for 5,727 men. Our estimate of what is necessary for health reduces this number to 3,953 men, which is the largest number the buildings ought to contain.

Barrack rooms which would, if otherwise fit, have contained about 300 men at 600 cubic feet per man were occupied at the time of our inquiry by the families of married soldiers, a fact which shows the need of separate accommodation of this class being provided with as little delay as possible in buildings specially constructed for the purpose.

It would appear that accommodation for 1,774 men should be added to that already existing to maintain in a healthy condition the number of troops for which there is at present regulation accommodation within the garrison.

The Governor and Commanding Royal Engineer should be requested to consider, in connexion with the improvements in existing barracks detailed in this report, in what manner any of the barracks could be extended. The accommodation which could not be so provided by extensions would required to be supplied by the construction of new barracks.

The extensions of existing barracks should be devised with peculiar care, in order not to interfere with the sanitary condition of the buildings.

The sites for new barracks should not be fixed upon military considerations alone, but the most healthy sites should be adopted. The Moorish Castle Barrack might be added to to a small extent with advantage as a sanitary measure. The most favourable arrangement for the health of the troops would probably be to extend the existing barrack at Windmill Hill, and if possible to build near it a part of the additional accommodation required. The number of huts at Europa Flats might be increased, especially as cooking arrangements have been already provided there for double the present number of men.

The general principles upon which such additions should be constructed have been already described in Part I. of this report, and are shown on Plans I., II., and III.

If the additional accommodation were provided in casemates, the casemates should not exceed 40 feet in length, and should have direct communication at both ends with the outer air; large windows at one end, a fire-place with ventilating grate, other ventilation by shafts and inlets, and a night urinal in the porch or other position such as would prevent smell in the room. In casemates with musketry loopholes, small windows to be covered with heavy loopholed iron shutters in case of war are much healthier than loopholes of the usual construction.

5.—Ventilation.

Except in the new Europa huts there are only two barracks in which the ventilation approaches to being sufficient, namely, Rosia barrack, which has louvres and large openings near the roof, and the Defensible barrack at Europa, in which the open airy situation, general structure, and numerous openings in the walls, afford facilities for free circulation of air. In all the casemates along the line wall, as well as in the Grand casemates, the natural means of ventilation by doors and windows are quite insufficient. The amount of window space in proportion to the cubic contents of the rooms is greatly too small. This is now unavoidable, and admits of no improvement, but it affords a strong reason for providing the requisite ventilation by every possible means.

In the greater proportion of the barrack rooms not casemates, the window space is not large enough, and the heads of the windows are not carried near enough to the ceiling. As there is in most cases no outlet above, all the space above the top of the window becomes a receptacle of foul air, which finds its way through the floors to the upper rooms. Any attempts at ventilation have been quite inadequate for the purpose in view. There is no complete system in any room. In a few cases there are outlet shafts too small or too short to be of use, or there are inlets, such as exist at the tops of the windows in Town Range and South barracks, so made as not to open unless the windows are opened, when they are not required, and to be always shut when the windows are shut.

The barracks generally have no fireplaces, and judging only from the temperature of the climate, none might be considered necessary; but during the rainy season, the air is so saturated with moisture, that every place, especially the casemates, becomes more or less damp, and at such times a fire becomes very necessary for health. The want of chimneys is also an important cause of defective ventilation at Gibraltar, and we are of opinion that it is absolutely necessary to supply this want wherever it is practicable to do so, at least in the casemates. The introduction of the new ventilating fire grates would enable a smaller quantity of fuel to suffice than with the ordinary barrack grate, on account of the large quantity of warm dry air these improved grates throw into the room. They would make a material difference, both in the dryness of the rooms and in the purity of the air, and smaller sized grates, with a smaller allowance of fuel (issued during December and January), would answer than at home for the same cubic contents.

All the barracks should be at once ventilated by shafts for removing vitiated air, and by inlets for supplying fresh air. The sectional area of the shafts and inlets, together with the principles on which they should be constructed, will be found in the first part of this report, and in Plans X. and XI.

In the South barrack, the rooms of which are divided into compartments by arches and piers, every compartment requires an outlet shaft on one side and an inlet for fresh air on the opposite side, and these inlets should be placed on the side of the barrack rooms facing the sea, to receive the benefit of the sea breeze. By such an arrangement alone can the very singular structural defects of this barrack be in any way compensated for, unless the whole interior were pulled down and altered.

The best form of ventilation for upper-floor rooms, huts, guard rooms, chapel-schools, and similar buildings, without ceilings, is by louvres or louvred turrets in the ridge, together with inlets for fresh air along the eaves, or Muir's, Mackinnel's, or Watson's ventilators would answer.

The circumstances presented by the structure, local position, and facility for external ventilation of the various classes of barrack accommodation on the rock differ so much that it is impossible to state precisely the amount of outlet or inlet area required in each case. We have recommended as the rule openings twice the area for the same cubic space laid down in our General Report on Barracks and Hospitals at home, and to provide against exceptional seasons and peculiarly exposed positions, each opening should have a valve to contract the area, but not to close it, in any room where the ventilation is found to be more than required for health. In this, as in other cases, the medical officer is held responsible for the state of the ventilation by the New Medical Regulations. The principles of ventilation are very simple, but serious errors have been made at home in applying them in detail; we would, therefore, suggest that Mr. Roberts, C.W., should be sent out temporarily to explain the details af the arrangements we recommend.

6.—Ablution and Bath Accommodation.

The means of personal cleanliness are deficient in all the barracks except in the new Europa huts.

The ablution arrangements are of a very primitive kind,—merely a small room, or a shed with a bench of stone or wood for basins to stand on, no water, except what is carried by hand, and no baths. In several barracks, as for instance, in the Grand Casemates, there is no ablution accommodation at all, and the men have to wash in the ditch or under an archway, which is at the same time a public thoroughfare. In King's Bastion they have to wash in the barrack yard. There are bathing parades from all the barracks, which are very necessary for health, but not sufficient for cleanliness. Salt water does not cleanse the skin like soap and soft water. But on the other hand there is so great a deficiency of fresh water in the garrison, that it would be difficult under the present system of water supply to find means of bathing 6,000 men once a week. Little more than two additional days' allowance per man per week would afford the whole garrison the means of thorough weekly ablution, and this should be taken into account in extending the supply.

All barracks at present unprovided with ablution rooms should be supplied with them without loss of time. Care should be taken not to place them in positions where they could diffuse damp through the rooms occupied by the men.

Fixed basins would give least trouble and use the smallest quantity of water. The amount of accommodation should be in the proportion of one basin to ten men. There should be gratings to stand on; pegs for coats, and benches. Slate slabs should be used in preference to wood.

A bath for every 100 men should be provided in a separate compartment. Water should be laid on to all the basins and baths, and the whole should be properly drained, lighted, and ventilated. As regards the introduction of baths, it would be desirable, in the first instance, to put up a few on trial to test the capabilities of the water supply. But until the soft water supply has been improved, we recommend that brackish or sea water, with an issue of marine soap, should be used for baths. Plain slate baths are best suited for soldiers' use.

The general arrangements required for ablution and bath rooms in existing barracks are shown on Plans XV., XVI., and XVII.

7.—Cook-houses.

The cook-houses vary in construction in different barracks. Sometimes they are in casemates, as in the Wellington Front barracks, and in all such instances it is next to impossible to ventilate them, for even with doors and windows open they are intolerably hot. This is partly due to hot air, partly to radiation from the apparatus, both of which sources of heat are much more sensibly felt in a warm climate like that of Gibraltar than at home. At the Town Range barracks there is a cook-house of an octagonal form, having the boilers arranged round a central shaft, with very free ventilation round it where the shaft passes through the roof. In these cook-houses there is a constant indraught of cooler air by doors and windows; the place is kept at a lower temperature; the construction is well suited for a warm climate, but the flues are rather difficult to keep clean.

Except at the Europa hut barracks all the cook-houses have old pattern boilers and furnaces, together with brick ovens. The arrangements are such as to consume a large quantity of coal without affording the requisite variety in cooking. The apparatus used in each barrack is given in Appendix No. 13.

Europa hut cook-house has been fitted up with one of Benham's cooking apparatus, intended for a barrack for 800 men, but after it was sent out the camp was reduced to 400 men, the remaining huts having been placed at Buena Vista; the apparatus was put up notwithstanding the reduction in numbers, so that it is only required to cook for one half the number of men it was made for. In consequence of this the saving of coal is by no means what it ought to have been. At present 320 lbs. of coal a day are consumed in cooking for 400 men, or nearly 13 oz. per man per day, which is an exorbitant amount.

The present garrison allowance of coal is 1⅔ lbs. per man, which represents the present consumption in the old pattern boilers and brick ovens.

With properly constructed boilers and ovens all the requisite cooking could be easily done with half a pound of coal per man per diem, which would save 950 tons per annum on a garrison of from 5,000 to 5,800 men; at 27*s.* a ton, this would amount to a saving of 1,280*l.* yearly.

We would propose to remodel all the cook-houses in the garrison, and to substitute the new steel boilers and steel ovens, shown in Plan XVIII.; and to prevent mistakes in putting them up, we recommend that Mr. Roberts, C.W., be directed to superintend the work until completed.

None of the cook-houses are supplied with water, and there can be no good clean cooking without this. Water should be laid on to all of them in connexion with the improved water supply and drainage for the barracks. Dressers, a sink, and a place for coal should be provided in each kitchen. The best arrangements for cook-houses are those embodied in Plan XIX.

8.—Women's Wash-houses.

All the arrangements for washing and drying linen are deficient. Most barracks have a wash-house of some sort, but it has no conveniences, except a boiler or two, and no water. It would be a great gain to health to provide suitable washing places, such as those now being constructed at home, having fixed tubs, with soft water laid on, boilers for heating water, a room with tables for ironing and getting up soldiers' linen, and a drying stove of the new pattern for drying it in wet weather. Improved wash-houses on Plan IX. should be erected near each set of married soldiers' quarters.

9.—Water Supply.

The remarks we have already made respecting the water supply of houses apply generally to that for barracks. Brackish or sea water will have to be laid on for all latrines and urinals. Soft water will have to be laid on for ablution and bath rooms, cook-houses, &c. For these latter purposes tanks at sufficient elevations will have to be provided, into which water from the existing barrack tanks can be pumped up, or which can be supplied by gravitation from the higher tanks we have described.

10.—Drainage.

The surface drainage of some barracks is very bad on account of the use of rubble stone for paving. This is the worst possible material, and ought to be disused for such purposes. The parade grounds of several casemated barracks are laid down with gravel of broken limestone, a substance which is intolerably dusty in dry weather, and in wet weather retains dirt and renders good surface drainage impracticable.

All the barrack yards should be flagged, and carefully sloped and channelled to trapped gulley grates. This improvement is also required for all narrow spaces of ground behind barracks, such as at the Town Range, South barracks, and Windmill Hill barracks. Where the barrack is isolated like that at Buena Vista, Moorish Castle, or Grand Casemates, the ground should be flagged along the sides to afford a clean pathway in wet weather, and to turn the rain away from the walls. Where the earth is higher than the floors, it ought to be cut away so as to have a flagged slope and channel a foot at least below the level of the floor.

As regards the general barrack drainage, it partakes of the defects of the town and house drainage we have already described. There are many bad drains. In one such case at the Moorish Castle, the filth oozes through the side of the drain on the face of the hill. Some drains are many times too large for the water they have to convey away. In other cases they get choked from want of fall and want of water. The outlet drains passing through barrack yards in the line wall are burst up by the first heavy shower of rain, flooding the barrack yards, because they have become literally choked with filth during the dry season.

The drainage of every barrack requires to be carefully examined, described, and entered on a plan. Built masonry sewers are required for no purpose in a barrack, and should be replaced by well-laid glazed pipe drains of sizes properly adjusted to the maximum rain-fall. Every ablution room, bath, cook-house, wash-house, latrine, and urinal should be drained, and there should be means provided for flushing out all the barrack drains, a duty which should be regularly attended to.

11.—Latrines.

The latrines usually consist of deep troughs communicating with a drain, and washed out more or less effectually by throwing water into them, but there is no water laid on. Sometimes there is no drainage, only a cesspool emptied periodically, usually at a very considerable cost. The latrines are extremely noxious and offensive, and very likely to be injurious to the health of the men during the prevalence of epidemic diseases. Certain of them are public nuisances, even on the highway. There are no divisions between the seats, and of course no doors. The light and ventilation of the buildings are very generally deficient.

The latrines generally require re-construction on the principles and plans recently introduced in this country. The best latrine for Gibraltar would be Macfarlane's or Jennings' latrine, Plans XII. and XIII., on account of the small quantity of water they require for use. Probably the material used by Mr. Jennings would be less acted on by sea water. Latrines should have proper divisions and half-doors, and all the buildings should be freely lighted and ventilated.

The urinals are badly formed and not properly drained, and there are no means of cleansing them. They should be formed of impervious material, in the manner shown on Plans XIII. and XIV.

Both latrines and urinals should be supplied with brackish or sea water in the manner already recommended, and some person in each barrack should be held responsible for their daily cleansing and general good order. As regards urinals, it will be sufficient to lay on water in such a manner as to admit of their being cleansed without the water constantly running over their surface. Night urinals should be provided wherever possible in lobbies near the barrack rooms, but cut off from them by cross ventilation. The latest improved form of night-urinal made by Mr. Jennings for the War Department, Plan XIV., is the best for this purpose.

12.—Married Quarters.

There is nothing in which Gibraltar is more deficient than in the amount and character of accommodation provided for married soldiers and their families. The details of all buildings occupied by married people on 1st October 1861 are given in Appendix No. 14, which show that, in the proper sense of the term, there is very little such accommodation, and none deserving the name except what belongs to the Royal Artillery, which is managed by the officers. This latter class consists of separate cottages or rooms in groups, tolerably clean and convenient. There are 46 of these Artillery quarters, occupied by 46 men, 46 women, and 71 children.

The Royal Engineers have also 31 separate quarters and 12 huts, built by themselves, occupied by 43 men, 43 women, and 79 children. The huts accommodate two or three families each. There are some special quarters for non-commissioned officers, but, with these exceptions, married soldiers occupy any kind of building that can be had. Thus there are 21 barrack rooms taken away from the men and occupied by 91 men, 91 women, and 137 children. Other families are lodged in stores, officers' quarters, kitchens, school rooms, guard rooms, workshops, wooden huts; in short, the need is so great, that any kind of place is used, and many of them are most objectionable as regards health and decency. We have hardly ever seen human dwellings so bad as some of the wooden huts on the Neutral Ground and at Windmill Hill. They are ruinous, not water-tight, in such a condition that it is impossible to preserve either cleanliness or decency in them, and the poor women and children are worse off in this respect than the lowest class of the Spanish population about them. In these married quarters, made out of all kinds of buildings, there were 183 men, 183 women, and 238 children living, while we were at Gibraltar. There were in all classes of accommodation, 363 men, 363 women, and 525 children.

The only provision for the married people, allowed by regulation, consists of ten cottages belonging to the Artillery and Engineers, while the married quarters of one room each required for the present strength of the garrison amount to 464 rooms.

To provide this accommodation is a matter of urgent necessity. It would set free barrack room space at present misappropriated from its legitimate object, and would to that extent diminish overcrowding. Since our visit a block of married quarters has been ordered on Crutchett's ramp above the grand casemates. A very good site for a considerable number can be found near the new school, between Buena Vista and Windmill Hill. There are also other available sites at Rosia and other places, where convenient quarters can be built.

We would recommend most strongly that a sum of at least 5,000*l.* a year should be provided for this class of accommodation until a sufficient number for the wants of the garrison have been constructed. We have already laid down the principles on which this class of accommodation should be provided, and we have shown their application in Plan V.

13.—Instruction and Recreation.

There are four ball courts for the entire garrison, or about a tenth part of the number required; some very inferior regimental workshops for armourers, tailors, and shoemakers, but none for employing the troops; two small libraries without reading rooms, and two or three good school rooms nearly finished; but with these exceptions Government has done nothing to provide places of recreation for the men in this large garrison, who are said to suffer very much from want of occupation. This great want and the evil consequences which followed on it, led to the establishment, by private means, under the zealous direction of Captain Jackson, R.A., of the first organized soldiers' "home" or "institute," an institution now under the patronage of the Governor, and which all parties concur in stating has been of great benefit to the troops. A committee was formed and funds were raised. Fortunately one of the best houses in Gibraltar in a central part of the town was secured. It was liberally and comfortably furnished, well supplied with books, periodicals, newspapers, and games, including a number of excellent billiard and bagatelle tables. The walls are hung with excellent maps and prints, and have stuffed seats round them.

All the rooms are lighted with gas, and coffee, tea, and other similar refreshments, excluding all intoxicating drinks, are sold to the men at a small price. The subscription is 4*d.* per month, and at the time we were in Gibraltar 2,300 subscribers were on the books, a result quite sufficient to justify the undertaking and to hold out great hopes of success for similar institutions elsewhere. A short time since Government made a grant of 500*l.* to this "home," to relieve the funds from the charge of certain preliminary expenses, and it has been money well spent.

The long distance of the central building from the south end of the rock led to the opening of a branch at Rosia, and we found a wooden hut had been put up further south still, as a second branch, which was also in full activity. It was in contemplation to provide a third branch at Europa, to extend the benefits of the institution all over the garrison.

After a careful inquiry into the merits of this institution, we have arrived at the conclusion that it is well worthy the countenance and support of Government.

It is, however, only advantageous to men when out of barracks, and although it is convenient, so far as distance is concerned, as a place of resort and rest for men of the north district while in the town, it would not be practicable to subdivide the institution into a sufficient number of branches to enable barrack reading and day rooms to be dispensed with. Under the peculiar local circumstances of Gibraltar both institutions are necessary. This felt necessity has led to the opening of a reading room at the South Barracks, under Colonel Fane's auspices, in a portion of the space properly belonging to the barrack accommodation. It was furnished, and supplied with paper, pens, and ink, to enable the men to write letters, and tea, coffee, and lemonade, &c., were sold at a small profit. The financial results of this arrangement were stated to be very favourable.

Every barrack should have its own reading and recreation rooms constructed in the manner described in Part I. of this report, and conducted on the principles laid down in the report of the Committee on Soldiers' Libraries and Reading-rooms, and Gibraltar is one of those garrisons where a garrison library could very well supply all the regimental libraries with books and games on the plan laid down in the Committee's report. But as already stated, this arrangement should in no way interfere with the "Home."

As far as regards means of out-door exercise, gymnasia, workshops, and generally means of providing rational occupation for men off duty, Gibraltar is as deficient as other garrison towns, and we would strongly advise that the advantages of these establishments should be afforded to the garrison as soon as means can be provided for the purpose.

14.—Hospital Accommodation.

There is no military hospital at this station, excepting temporary accommodation, set apart from time to time on the Neutral Ground or at Europa. The sick of the garrison are received into a large hospital at Rosia, belonging to the Royal Navy, an account of which we have given elsewhere. We have simply to state the fact, that for a garrison of upwards of 5,000 men there is no hospital; and that if, in the event of war, it should become necessary to receive sick and wounded men from the fleet as well as from the garrison, this could only be done in the existing building by overcrowding the wards to such an extent as would lead to very disastrous consequences.

The working of the present system shows that in time of peace no great practical difficulty arises from receiving sick from the fleet into the wards, except that the cubic space per bed is too small, and less than what is required by regulation. It would hardly be necessary to incur the cost of building an additional establishment for a rare emergency, which might be met by erecting temporary huts on Windmill Hill; but as the present hospital is defective in many important points of construction required for general hospital administration, it would be in the highest degree desirable to enter into some arrangement with the Admiralty, whereby the present building should be transferred to the War Office. If this were done there would be no difficulty in providing for any temporary extension the building might require to enable sick to be received from the fleet in any required numbers. The evil of the present arrangement is, that the building, as it is, does not fulfil the requirements of a military hospital, and that to make it do so, it would be necessary to incur expense in altering property belonging to another department which might find (in the event of its reclaiming the building, which it can do at any time) that the alterations were unsuitable to the habits and customs of the service.

We have endeavoured in the subsequent part of this report to lay down a plan for rearranging the allotment of rooms and wards, and for consolidating the administration, which will enable the most to be made of the existing building; at the smallest cost, and with the least possible disturbance in its structure. But it must be evident that at the best the arrangements must necessarily be of a temporary character, and on this account unsatisfactory in practice. The main question to be settled is to whom the hospital really should belong. The facts of the case would appear to indicate that the buildings should be transferred to the War Department, which has constant need of them and almost exclusively occupies them, under such reservations as to providing accommodation for the sick and wounded of the fleet when necessary, as the interests of the public service require.

15.—Recapitulation.

The following are the chief points bearing on the health of the troops in Gibraltar, together with the improvements we have to recommend:—

1. The main causes of inefficiency and mortality in the garrison are miasmatic diseases, chiefly fevers of the continued and typhoid types, and consumption, together with syphilitic diseases.

2. That so far as regards local topography and climate, by themselves, there is nothing peculiarly unfavourable to health.

3. That there are very serious sanitary defects in the garrison, arising from the condition of the drainage and water supply, the local position and construction of casemates on the lower levels, and especially on the line wall, and in the construction of some other barracks, which are injurious to the health of troops.

4. There is want of proper ventilation and of means of warming and drying the air of casemates in the rainy season, from which and from the use of stone floors, especially in the low-lying localities, many of the barrack rooms are damp for a considerable part of the year.

5. There is much overcrowding in all the barracks, except in the newly-constructed huts.

6. The means of personal cleanliness are deficient.

7. The cooking arrangements are in an unsatisfactory state.

8. There are no suitable means of washing and drying linen.

9. The latrines and urinals are in a very noxious condition.

10. The paving in barrack yards and round barracks is not sufficient for surface drainage and cleansing.

11. The accommodation for married men, non-commissioned officers, and soldiers, is very deficient in amount, and some of it of a very unhealthy character.

12. That while we consider the "soldiers' home" of great benefit to the garrison, we are at the same time of opinion that suitable means of instruction, recreation, and employment connected with barracks are greatly required. These, together with proper gymnastic training, would improve the health of the garrison, and would tend to diminish the amount of disease resulting from intemperance and dissipation, the invariable accompaniments of want of occupation. In this way the outlay would be soon repaid.

Lastly, we would recommend, generally, the execution of the proposed measures of drainage and water supply with the least possible delay; that the present privies be reconstructed with Macfarlane's or Jennings' latrines, and supplied with brackish or sea water for cleansing; that the urinals have similar water laid on to enable them to be washed and kept clean; that as soon as an adequate supply is obtained, fresh water be laid on to all barracks for ablution, bathing, cooking, and washing; that the surface paving and channelling in barrack yards and about barracks be in future done with flags or asphalte; that all the casemates and barracks be ventilated in the manner pointed out, and all casemates provided with fireplaces; that provision be made with as little delay as possible for affording 600 cubic feet or more per man in barrack rooms, according to their construction and local position; that the barrack room floors be boarded over the flags, with ventilation beneath; that the ablution accommodation be extended and improved and baths provided; that improved boilers and ovens be placed in the cook-houses, and the ventilation of all the cook-houses requiring it be improved; that suitable places for washing and ironing linen be provided, with drying closets of the approved pattern for winter use; that the latrine buildings be reconstructed with divisions of seats and half-doors, and provided, with light and ventilation; urinals for barrack rooms and barrack yards of an improved construction, and of non-porous material, capable of being cleansed with water, should also be introduced; married quarters should be built, and additional provision made as regards libraries, reading rooms, game rooms, workshops, gymnasia, and means of exercise in connexion with the barracks.

SECTION III.—SANITARY DETAILS REGARDING EACH BARRACK AND HOSPITAL.

Having stated, generally, the sanitary defects in these barracks, together with the remedies required, we next proceed to describe each barrack separately.

1.—Grand Casemates.

The Grand Casemates are situated immediately within the northern extremity of the works, close to the Landport and Waterport gates. They bound one side of a polygonal area, the other sides of which are bounded by officers' quarters, guard room, gate, schools, and workshops. All the traffic from the Spanish lines and the water port passes across the ground, and the surface being macadamized there is much dust and glare from it. The site is very low and only a few feet above water mark. It is indeed nothing more than a narrow strip of sand and debris lying between the precipitous rock and the water. The rock cuts off ventilation on one side. The works are close to the back of the casemates on another side, and the front area, although of considerable dimensions, is shut in by the buildings already mentioned, and partly by the houses of the town. The cookhouses, wash-houses, canteen, and non-commissioned officers' quarters are in a narrow court behind the barracks, abutting against the fortifications, and together with walls which cross the space, they interfere injuriously with the external ventilation.

One result of the lowness of the site of these barracks, and their topographical relation to the rock, the sea, and the adjacent works, is that the subsoil on which they stand is always wet or damp. The damp passes through the stone pavement of the ground floors, and was quite perceptible when we were there at the end of the dry season.

The barracks are in two floors, and contain 26 rooms, 12 on the ground floor and 14 on the upper floor. They are all casemated, and not being built against the curtain, but separated from it by a narrow intervening space, they have windows and doors at each end. The ground-floor rooms are very nearly 100 feet in length, which is the distance between the opposite windows and doors. The beds are arranged with their heads to the piers of the arches. The upper rooms are 87 feet in length, and are shorter on account of a terrace being taken off from the lower rooms to give access by stairs at each end to the upper rooms. Both sets of rooms open directly on the outer air. The upper floors are boarded; those on the ground floor are flagged and are below the level of the ground outside. The casemates next the rock are dark, damp, and hardly fit for occupation. They are at present used for married quarters. The upper rooms are somewhat better, but they are all too long to admit of good ventilation, and show inattention to the requirements for health in their plan.

The upper rooms have arched brick roofs supporting the bombproof, through which the rain comes at certain points and drops on the men's beds.

Each room has a door and two windows at either end, with fan-lights over most of the doors, and they communicate by arched doorways in the division walls, whereby the ventilation is common throughout. Each room appears to have two empty fireplaces, with chimneys carried up in the division walls; grates have never been used in them.

The accommodation consists of 26 rooms, and is intended for 1,166 non-commissioned officers and men; the details are as follow:—

Rooms.	Regulation Number of Men per Room.	Dimensions of Rooms.			Cubic Feet per Man.	Superficial Feet per Man.	Number of Men each Room should contain.	Windows per Room.		
		Length.	Breadth.	Height.				Number.	Height.	Width.
Ground Floor.		Ft. In.	Ft. In.	Ft. In.					Ft. In.	Ft. In.
Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 -	47	99 6	18 0	12 0	$457\frac{13}{47}$	$38\frac{5}{47}$	30	4 2 fan-lights.	6 0	3 0
First Floor.										
Nos. 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26 -	43	87 0	18 0	10 0	$364\frac{8}{43}$	$36\frac{18}{43}$	25	4 2 fan-lights.	6 0	3 0
Total - -	1,166	—	—	—	—	—	710	—	—	—
Guard rooms—										
Artillery -	5	29 0	16 0	11 0	$1{,}020\frac{4}{5}$	$92\frac{4}{5}$	—	1	5 6	2 8
Line - -	9	29 0	16 0	11 0	$567\frac{1}{9}$	$51\frac{5}{9}$	—	1	5 6	2 8
Cells, 6 - -	1	7 0	4 0	9 0	252	28	—	None.	—	—

Overcrowding.—A reference to this table will show that these barracks are greatly overcrowded. It appears that 564 men have each about two-thirds of the space required for health at home; while 602 men have each little more than one half the space they ought to have at home. The largest number of men which each of these ground floor casemates ought to hold is 30 instead of 47. In the upper floor the number should be reduced from 43 to 25 men per room. This would give available accommodation for 710 men instead of 1,166, and the reduction would only allow a fraction more than 600 cubic feet per man. Except those at Hargreaves' barracks, the cells are the smallest we have ever seen. There is space in four of them put together for only one prisoner instead of four.

Ventilation.—The only means of ventilation are the doors and windows at each end, which are 99 feet 6 inches apart in the lower-floor rooms, and small chimney flues from the fire-places with openings 10 inches by 4, terminating on the level of the terreplein above. During heavy rains the rain beats into the openings and passes down the shafts into the rooms. It need scarcely be stated that the ventilation is very defective. The atmosphere in the rooms at night is offensive and bad. Zymotic diseases generally begin in the worst ventilated and most crowded rooms: on a recent occasion cholera broke out first on the ground floor. Overcrowding, bad ventilation, and damp are the causes why troops in this barrack are unhealthy and suffer from epidemic diseases.

To improve the ventilation it will be necessary to carry a shaft through the crown of each arch on the upper floor, as near the centre of the room as possible. One of Muir's construction, Fig. 19, will be found most suitable. It should have louvres at its lower end, to prevent down-draughts as far as possible, and to disperse any such over the room. Inlets for fresh air should be made close to the top of the arch, at each end over the door, and should be permanently louvred. The arrangement of shafts and inlets is shown in Plans X. and XI., Figs. 1 and 2.

The lower-floor rooms require shafts to be carried up the walls and through the roof of the casemates above. They should also have inlets for fresh air at the ends. Openings should at the same time be made into the chimney flues, not supplied with fire grates, as high up as possible. Care should be taken to keep the ventilating shafts quite distinct from each room to above the roof, to prevent foul air escaping from the lower into the upper room, either directly or indirectly. The doors between the rooms should all be closed. It is a cardinal point as regards ventilation, to keep the ventilation of each room distinct from that of every other. All the rooms are lighted with gas.

Ventilating fire grates should be introduced into all the lower-floor rooms, at least.

The floors should be boarded over, with ventilation beneath.

Ablution and Bath Accommodation.—There is none. The necessity for anything of the kind appears never to have been considered in the construction, and the men have to perform their ablutions in a gusty archway, passing through the lower floor of the barrack, which is also a public way into the town. A thin wooden partition separates the passengers imperfectly from the space where the men wash themselves. There is a wooden bench, but no water laid on; it has to be carried by hand. There is also a bench in the ditch behind the barrack, on which men can place their basins. It is close under the Landport drawbridge, which is one of the main entrances to the town, and the men have to perform their ablutions in sight of the passengers. There are no baths.

A proper ablution room, as in Plan XVII., with a few baths and water laid on, are absolutely indispensable for cleanliness, and should be provided forthwith. The present arrangement is highly discreditable, and has been frequently reported by the Governor.

Cook-houses.—These are behind the barracks, in a narrow court between them and the works. They are seven in number, and contain 29 boilers and 2 brick ovens. There are 3 belonging to the men and one belonging to the serjeants' mess. One or two of them require more ventilation, and the ovens are not good. Practically, these kitchens do not afford sufficient means for cooking, and require the new pattern steel boilers and ovens, Plan XVIII. There is no water laid on. It has all to be raised from a pump and carried by hand. There is no proper drainage of the kitchens. All waste water is thrown down a drain, in front of the doors, in the narrow court between the cook-house and the barracks.

Women's Wash-house.—There is one wash-house in the same line as the cook-houses. It has nothing in it for washing except boilers. There is no roof ventilation.

Drainage.—The drainage of the barracks is very defective on account of the very small fall. This will be always a difficulty with these barracks, but many of the practical evils will be remedied under the proposed new drainage works for the garrison.

Water Supply.—This is derived from a tank and well. It is not laid on for any purpose, and requires entire re-arrangement when proper ablution rooms, latrines, &c., are constructed.

Privies and Urinals.—The privies are simply seats without divisions placed over an open trough or drain, washed out daily by allowing water from a cistern to flow through it. The trough is never properly cleaned out, and the whole arrangement is offensive and requires reconstruction with Macfarlane's or Jennings' latrine, Plans XII. and XIII. The latrine should be raised above the level of the ground, to give the requisite fall for drainage. The buildings require additional roof ventilation.

There is a privy belonging to the market at the Waterport, close to the barracks, which discharges its contents into the sea, and is a great nuisance because the water is kept in a stagnant condition by the old mole at this point. It should be reconstructed as a water latrine, and discharged not directly into the sea but into the general system of drainage for that end of the town, the outlet for which is south of the old mole. Macfarlane's iron latrine, sufficiently raised above the ground to obtain the required fall, would answer the purpose. All these latrines should have a constant supply of sea or brackish water attached to them.

Cleansing.—There is an ashpit close to the privies; an iron box should be substituted for it, and the contents emptied into a cart and removed daily. Ashpits in so confined a locality and in such a climate, are quite inadmissible.

Married Quarters.—The non-commissioned officers' quarters are in the same narrow court-yard where the cook-house is. They are partly under a lean-to, partly in arched recesses under the terreplein. They are very deficient in accommodation; damp, particularly the inner half, under the battery; they have no through draught; they have stone floors, and, taken as a whole, are unfit for occupation.

There are no married soldiers' quarters. Three of the worst of the men's rooms on the ground floor are misappropriated for the purpose, and occupied by different families without proper divisions.

Canteen.—None. Only a small shed behind the casemates.

Schools, Workshops, &c.—These are situated in a one-story building, bounding one side of the parade ground. There are two schools, good, light, and well ventilated; one, not required, was about to be turned into a reading and day room. The shops are by no means so good as the school rooms. There is one for tailors and shoemakers, which is too small, and part of the adjacent store has to be used for the shoemakers, to the diminution of the store accommodation. There is another small dark tailor's shop near the non-commissioned officers' quarters. The armourer's shop in the same range is very bad.

Guard Rooms.—There are two guard rooms. That for the line regiment is very small and crowded, and has no lock-up room. It requires a ventilating shaft in the roof, and a remodelled fire-grate.

The Artillery guard room is about the same size, but has a smaller number of men in it and is less crowded. There are six cells, very small, with stone floors; they have no ceilings. They are ventilated as well as their small cubic contents will allow.

The Main Guard at the Waterport has a room for the men and one for the serjeant. The urinal has been placed close to the guard room door, and should be removed to a greater distance.

It will be seen that the great sanitary defects in these barracks, besides their local position, stone floors, and bad construction, are overcrowding, want of ventilation, want of means of personal cleanliness, no proper water supply, defective cook-houses and cooking arrangements, insufficient means of washing linen, badly-constructed privies and urinals, want of married quarters and proper workshops, and want of ventilation and other arrangements in guard houses.

We would recommend all the defects, admitting of remedy, to be dealt with on the general principles already laid down.

MONTAGUE CAVALIER GUARD is a small guard room overlooking the old mole. It has no privy nor place for ablution. It has a urinal and also a fireplace, but has no ventiation. It requires a shaft in the roof for removing foul air, and an inlet for fresh air in the walls near the ceiling.

2.—ORANGE BASTION.

This work is part of the sea front of the fortifications, and contains 4 bomb-proof rooms built side by side. The situation is very low, being only a few feet above the water level. The rooms are entered from a small triangular court yard, about 6,572 square feet in extent, sunk below the surrounding levels and buildings. The surface of this court was badly paved and drained at the time we saw it, and the stones were damp even in dry weather. The external ventilation is most deficient, and is only compensated for in any degree by the sea breeze sweeping over the top of the works. The barrack rooms are no less than 104 feet long and only 14 feet wide. When we visited them at night the beds were so close together that it was difficult to move along between them. Each casemate has a door and two windows, one on each side the door, with an opening over the door, and two loopholes at the far end. The result is that the rooms are dark, damp, gloomy, and uncomfortable. The floors are of stone, and are damp from the wet subsoil below. The whole barrack is a very bad specimen of casemate construction, and admits of very little improvement. It is built of limestone, and the arches are so insufficiently protected that water comes through in rainy weather and adds to the dampness of the rooms.

The following table gives the accommodation :—

Rooms.	Regulation Number of Men per Room.	Dimensions of Rooms.			Cubic Feet per Man.	Superficial Feet per Man.	Number of Men each Room should contain.	Windows per Room.		
		Length.	Breadth.	Height.				Number.	Height.	Width.
Nos. 1, 2, 3, 4	40	Ft. In. 104 8	Ft. 14	Ft. In. 11 6	$418\frac{6}{10}$	Ft. In. 33 11	20	2	Ft. In. 5 6	Ft. In. 2 6
Total -	160	—	—	—	—	—	80	—	—	—
Guard Room, 1 Non-Commissioned Officer and 3 Men -	4	9 11	11 10	9 10	—	—	—	1	2 5	1 11

Overcrowding.—The regulation space of 418 cubic feet per bed shows great overcrowding. If the barrack were otherwise good and situated in a cold climate, the present regulation would place in it a third more men per room than would be considered safe for health. We are of opinion that, taking into account the local position and bad construction of the casemates, no more than 20 men per room should be permitted to inhabit them.

Ventilation.—The only means of ventilation for these long rooms consists of three openings in the arch leading into a horizontal shaft, terminating in a chimney 5 or 6 feet in height. The arrangement is of little use, for we found the air most offensive in visiting the rooms at night. We would propose to improve the ventilation by enlarging the openings and shafts to three times, at least, their present sectional area, and by raising the vertical portion at least 12 feet in height, and protecting them against rain. Louvred openings 18 inches square should also be made in the walls at both ends close under the soffit of the arch, to admit more fresh air. Valves should be provided, to enable the area of the shafts to be diminished to their present size in cold weather. Ventilating fire grates are also absolutely necessary to keep the arches moderately dry in the rainy season. The floors should be boarded over, with ventilation beneath.

The rooms are lighted with gas.

Ablution and Bath Accommodation.—There is an ablution shed with louvred end and side for ventilation. It has benches of stone and wood to hold the basins and buckets in which the men wash. The floor is of asphalte, with a drain opening in the middle There is no water laid on. There is no bath. One bath with a water-supply is required. Water should also be laid on to the ablution benches. This ablution room is used by the women for washing linen, as there is no accommodation for the purpose.

Cook-house.—The cook-house is large and airy. It contains 5 boilers of the ordinary pattern, and a brick oven. Steel boilers and an oven of the improved construction, Plan XVIII., should be substituted for the present apparatus.

Water Supply and Drainage.—There is a well in the court yard yielding brackish water unfit for use. The only other water is supplied by the commissariat. The quantity carried in barrels for cooking, ablution, &c. for 90 men, is 20 barrels a day.

As already stated, the surface drainage and paving are not good. A large town sewer passes under the court yard of the barrack through the works into the sea. It is discharged by an iron pipe, but not into a sufficient depth of water, consequently there is much nuisance experienced at times from foul decomposing sea water immediately outside the works.

Privies and Urinals.—The latrine is of the same bad construction as that in the Grand Casemates already described ; it consists of a deep trough without water, except what is passed through it once in 24 hours, and is most offensive. The urinals are also of defective structure, and have no water. There is drainage into the large sewer already mentioned.

The whole requires reconstruction, as a water latrine on Macfarlane's or Jennings' principle, with divisions of seats and half-doors.

Cleansing.—There is no ashpit. The only proper method of cleansing for such barracks as this is the one adopted. All refuse is thrown into an iron box and removed daily.

Guard Room.—The guard room has a window at the back, admitting of ventilation. It is occupied by one non-commissioned officer and three men. It has a stone floor. The lock-up is badly paved, and the floor is damp. The ventilation is not sufficient. There is gas in the guard room.

Married Quarters.—There are no married soldiers except the serjeant, who has a room, with a fire-place and old pattern grate.

The sanitary defects in this barrack are, bad position, over-crowding, bad ventilation, darkness, damp, want of water, bad latrines and urinals, and defective drainage. The first of these admits of no alleviation. All the others can be more or less removed.

3.—Prince Albert's Front.

This is a recent work, situated in the line of wall to the south of Orange Bastion. It consists of a number of casemates built into the wall with their axes at right angles to its direction. Five of these were occupied by troops at the time we inspected them, and some others, intended for stores, were in use as married quarters.

The position is very low and confined, on the sea shore little raised above the water level, and the ground on which the town stands, exclusive of the height of the houses, is higher than the casemates.

There is a narrow yard of about 24,750 superficial feet in front of the men's quarters. Opposite the casemates used by soldiers' families, there is a high wall, which obstructs light and makes the rooms almost dark.

Each room has a door with a fanlight over it, and a window on each side the door. Two of the rooms have loopholes, but they cannot be kept open on account of the disagreeable smell proceeding from the mixture of sewage and stagnant salt water outside. The rooms are connected by arches in the division walls, and have their ventilation in common.

All that part of the barrack which is under the battery is very damp during winter and wet weather.

One of the town sewers passes under the court yard in front, and also under the works to the sea; and whenever the heavy rains begin to fall, the sewer is burst close to the barracks; the court yard becomes more or less flooded; a most abominable nuisance arises, until the accumulated obstructions can be cleared out and the water way restored.

This great evil will be remedied by the proposed diversion of the higher sewage from the low lying districts.

All the floors are of stone instead of wood, and are liable to damp

There is no gas, the rooms are lighted with oil lamps.

The following table gives the accommodation in this barrack :—

Rooms.*	Regulation Number of Men per Room.	Dimensions of Rooms.			Cubic Feet per Man.	Superficial Feet per Man.	Number of Men each Room should contain.	Windows.		
		Length.	Breadth.	Height.				Number.	Height.	Width.
Nos.		Ft. In.	Ft. In.	Ft. In.					Ft. In.	Ft. In.
3	12	51 10	17 8	11 6	$877\frac{1}{2}$	$76\frac{3}{12}$	12	2	5 8	3 6
4	29	55 0	18 0	11 6	$392\frac{17}{29}$	$35\frac{5}{29}$	18	2	,, ,,	,, ,,
5	32	58 8	17 10	11 6	$375\frac{15}{16}$	$32\frac{1}{12}$	19	2	,, ,,	,, ,,
6	29	55 4	17 10	11 6	$391\frac{8}{29}$	34	18	2	,, ,,	,, ,,
7	12	51 10	18 0	11 6	$894\frac{1}{12}$	$46\frac{13}{20}$	12	2	,, ,,	,, ,,
Total -	114	—	—	—	—	—	79	—	—	—
Guard Room	4	18 0	18 0	11 6	—	—	—	2	5 8	3 6
Lock-up -	—	18 0	7 0	11 6	—	—	—	—	—	—

Overcrowding.—The table shows that rooms 4, 5, and 6 are very much overcrowded. They ought to have respectively no more than 18, 19, and 18 men at the very most, allotted to them.

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* No. 1 is used as a Guard Room, No. 2 as Married quarters.

Ventilation.—Each room has a shaft, 1 foot 10 inches diameter, carried up from the top of the end wall, opposite the door, into the parapet above, on the inner side of which it opens. There are no inlets for fresh air. The shafts require to be enlarged to the proportionate areas laid down in the previous part of this report; and louvred openings, of the same proportionate areas, should be made close to the arches above the doors to act as inlets. There are no chimneys or fireplaces. It is essential to health that these casemates should be provided with ventilating firegrates. The floors should be boarded and raised to allow ventilation beneath.

Ablution and Bath Accommodation.—The ablution room is a shed building adjoining the wash-house. It has a stone bench, and the men wash in the usual basins. There is no bath, no water supply, and the means of cleanliness are deficient. The ablution arrangements should be remodelled, as in Plans XV., XVI., and XVII., and one bath at least provided.

Cook-house.—This is situated in one of the casemates. It has four boilers and a brick oven, which does not appear to answer, as the cooking is said not to be sufficiently varied. The room is ventilated by a shaft, and there are three loopholes at the end. The new steel boilers and steel oven, Plan XVIII., should be supplied.

Water Supply and Drainage.—There is a pump in the court yard, which supplies brackish water unfit for use; all the other water has to be carried by the commissariat. The barracks are drained into the sewer, which bursts periodically. The surface drains are trapped.

Women's Wash-house.—None. There are no means either for washing or drying linen except in the barrack yard.

Latrines and Urinals.—There is a latrine of the usual form, washed out daily from a cistern which has no water except what is put into it by a fatigue party. The whole arrangement is extremely imperfect and offensive. The urinal is in the same place as the latrine, and is also offensive from want of water for cleansing. The place where the latrine is situated is dark and badly ventilated. There are no divisions between the seats. The whole requires reconstruction. A Macfarlane's or Jennings' latrine, raised a foot above the floor, would afford the fall and means of flushing requisite to sweep the contents into the sea.

In this barrack also there are no ashpits, and the refuse is carried away daily as it ought to be.

Married Quarters.—These are in store rooms, misappropriated for the purpose, and scarcely fit for human habitation.

Guard Room.—There is a tolerably good guard room and lock-up, both have ventilation. The guard room has a fireplace.

The sanitary defects in Prince Albert's Front barrack are, low, damp, dark locality, overcrowding, defective ventilation, stone floors instead of wooden floors, want of fireplaces, no water supply, bad drainage, imperfect latrines and urinals, want of sufficient means of cleanliness, defective cooking arrangements. These defects should be removed in accordance with the principles we have already laid down.

4.—King's Bastion.

This work is situated at the southern end of Prince Albert's Front. It projects out from the main line of defences towards the sea, and the casemates face towards the inclosed area of the bastion, with their ends outwards. The barrack square has 16,836 superficial feet of surface. The position is very little above the water level, so little that water occasionally rises through the stone floors of the barrack rooms. Recently a range of loopholed buildings, containing officers' quarters, has been built across the gorge of the bastion, a measure which has converted the whole work into a deep sunk damp court, with little external ventilation.

The barrack rooms are low, narrow, long, dark, and damp casemates, resembling an inferior kind of cellars. Each has a door with a small window on either side, and a fanlight above. Some of them are not water-tight, and it is stated that rain sometimes comes through the arches like a drip-stone. Each casemate has a fireplace at the far end, used during the winter.

The rooms are so narrow (only 14 feet wide) that when the beds are made down they all but touch each other.

The court yard is paved with rough cobble stones, in a bad condition as regards surface drainage, and there is a large offensive gulley grate in the middle of it.

One of the town sewers passes through the works close to the north end of the barracks. It had become obstructed, and was being opened and cleansed at the time we were there, to the endangering the health of the barrack.

Taken as a whole, this is one of the worst casemated barracks we have ever inspected; and apart from any considerations of health, very little of it is fit for human habitation.

The officers' quarters in the retrenchment are on two floors, the lower floor being below the level of the road which passes close to it. They have loopholes towards the barrack court yard, and doors and windows towards the town side. The stairs between the floors are very dark, and consequently very dirty. The verandah giving access to the rooms is too narrow.

The following table gives the men's accommodation in the casemates:—

Rooms.	Regulation Number of Men per Room.	Dimensions of Rooms.			Cubic Feet per Man.	Superficial Area per Man.	Number of Men each Room should contain.	Windows per Room.		
		Length.	Breadth.	Height.				Number.	Height.	Width.
No.		Ft. In.	Ft. In.	Ft. In.					Ft. In.	Ft. In.
16	16	45 0	14 0	11 0	433⅛	39⅜	8	2	3 0	1 6
Total - -	256	—	—	—	—	—	128	—	—	—
Guard Room	—	16 0	15 0	10 6	—	—	—	2	4 9	2 9
Cells 2 -	—	9 9	7 3	10 6	—	—	—	—	—	—

Overcrowding.—Each of these bad rooms has about double the number of men it ought to have in it. By allotting eight men per room the cubic space per men would be 866 feet, certainly the smallest amount consistent with anything like health in such a place.

In a recent report on this barrack made by Major-General Sir Robert Walpole, he says, "The closeness and stench of those rooms at night are terrible." This is due to their low position, bad construction, want of means of renewing the air, and excessive overcrowding.

Ventilation.—There are no means of ventilation except the doors and small windows, and the fireplace when there is a fire.

The rooms are dark by day, and there is no gas at night. Oil lamps are used for lighting. There are fixed shelves along the walls and hanging shelves of wood are carried across the room, interfering with any movement of the air within.

Remodelled fire grates should be introduced, and a ventilating shaft carried up from the crown of the arch, Plan XI., Fig. 3. There should be permanent louvres in the wall close to the arch above the doorway. Ventilated gas burners, so arranged as to assist the ventilation of the rooms, should be provided.

The floor flags should be boarded over, with free ventilation beneath.

Ablution and Bath Accommodation.—None. Men wash in the yard.

Cook-houses.—There are two cook-houses situated in casemates. They have each 4 boilers and a brick oven, which appears to be little used. The ventilation is deficient in both cook-houses.

Women's Wash-house.—A number of married people live in the barrack, for whom there is no washing accommodation. They have to wash and dry linen in the barrack yard in all weathers.

Water Supply.—The only source of water in the barrack is a brackish well in the yard. Water has to be carted by the commissariat, or carried by fatigue parties.

Latrines, Urinals, and Drainage.—The latrines and urinals are in a casemate, between which and the cook-house there is a barrack room. The latrine is merely a trough washed out very imperfectly through a drain into the sea. The surface drainage of the barrack appears to be connected with the same drain. The urinal is in the latrine, and water poured into it passes through the latrine. The casemate where they are situated is not sufficiently ventilated, and the place is extremely offensive.

At one end of the retrenchment built across the gorge of the bastion there is another set of latrines of a better construction. The trough is not so deep and water stands in it.

Both latrines should have Macfarlane's or Jennings' apparatus substituted for the present defective arrangements. It should be raised above the level sufficiently to afford a good fall for the sewage.

Cleansing.—There is no ashpit. All refuse is collected in iron boxes and removed daily. This is the only good point in the establishment.

Married Quarters.—The accommodation provided for married soldiers is of a most miserable description. It consists of a certain number of the worst casemates, misappropriated from the barrack accommodation. The casemates are unfit for either purpose, but being so abstracted, the men have been more overcrowded in the other casemates in consequence. Families are not separated from each other, except by curtains, at night.

There is no place for cooking, and the women have to prepare their meals on small earthenware fireplaces in the open court yard.

Guard Room and Cells.—These are situated in the retrenchment. The guard room has windows on one side, and the cells have loopholes. There are no other means of ventilation.

The sanitary defects in this barrack are, low damp position, bad drainage, bad construction, overcrowding, want of ventilation, no gas, want of good water, want of ablution and bath accommodation, and also of means of washing and drying linen; bad latrines and urinals; no suitable married quarters. The place is altogether so unsuited for a barrack that were it possible to leave it unoccupied at ordinary times, it would be better to do so. Otherwise, the defects pointed out should be remedied with as little delay as possible.

5.—Wellington Front.

This is a recently-constructed work, and consists of two salients and a curtain, at a short distance south of King's Bastion.

The position is on the sea-shore, low and damp, especially in rainy weather. The site has all the defects of the others we have described, but the casemates are of better construction; at least they are larger, loftier, and make better rooms. The rooms in the curtain are arched bomb-proofs, with one end towards the barrack yard and the other towards the wall. The barrack yard has an area of 24,156 square feet. The rooms in the angles are sub-structures, supporting the terreplein on a number of piers and arches, covering a considerable area, and converted into barrack rooms by carrying partial walls across the spaces between the piers, leaving the arches open above. It results from this form of construction that certain only of the rooms have direct access from the open air, and several inner rooms have to be reached by passing through the outer rooms. These inner rooms have no light or ventilation, except such as they receive by the doors in the party walls or through the vacant spaces left under the arches. Some of them have shafts carried up in the back wall to the parapet; others have none, and the means of ventilation are quite insufficient. The casemates in the curtain have shafts carried up in the back walls. At the end of the dry season, when we inspected these barracks, there was appearance of damp in them; they have no fireplaces, and during the rainy season they are said to be extremely damp.

The door and window space varies in different sets of rooms. Those in the curtain have a window on each side of the door, with a fixed fanlight over it, and a circular opening over the fanlight which can be closed by a shutter. A number of rooms have neither doors nor windows to the outer air on account of the construction.

The following table gives the accommodation :—

Rooms.	Regulation Number of Men per Room.	Dimensions of Rooms.			Cubic Feet per Man.	Superficial Feet per Man.	Number of Men each Room should contain.	Windows.		
		Length.	Breadth.	Height.				Number.	Height.	Width.
		Ft. in.	Ft.	Ft.					Ft. in.	Ft. in.
Nos. 1 to 7, 10 to 19, 22, 23, 26 (20 rooms)	19	34 0	18	15	$483\frac{3}{19}$	$32\frac{4}{19}$	14	2	5 4	3 0
No. 8 - -	18	32 6	18	15	$487\frac{1}{2}$	38	13	2	5 4	3 0
„ 9 - -	20	38 0	18	15	513	$34\frac{1}{2}$	15	2	5 4	3 0
„ 20 - -	18	38 0	18	15	570	38	15	2	5 4	3 0
„ 21 - -	18	32 0	18	15	480	32	13	2	5 4	3 0
„ 24 - -	18	34 0	18	15	510	34	14	2	5 4	3 0
„ 25 - -	17	38 0	18	15	$603\frac{9}{17}$	$40\frac{4}{17}$	15	2	5 4	3 0
„ 27 - -	20	34 0	18	15	459	$30\frac{4}{5}$	14	2	5 4	3 0
„ 28 - -	24	34 0	18	15	$382\frac{1}{2}$	26	14	2	5 4	3 0
Total -	533	—	—	—	—	—	393	—	—	—
Guard-room -	—	31 0	18	15	—	—	—	—	5 4	3 0
Four cells -	—	14 10	8	15	—	—	—	—	5 4	3 0

Overcrowding.—It will be seen from this table that all the rooms are more or less overcrowded. To afford even moderate cubic space it would be necessary to remove five men out of each of the 20 19-men rooms, and as many out of the others as would give about 650 cubic feet to the remainder. This will reduce the accommodation from 533 to 393 men.

Ventilation.—The means of ventilation are those already described. They are insufficient, and can hardly be said to exist in the inner rooms, some of which have loopholes only. All the rooms require shafts of sufficient area introduced as in Plan XI., Fig. 3. The circular openings over the doors should have permanent louvres placed in them. All the fanlights should be made to open inwards, and improved fireplaces should be constructed in each room.

The flags should be boarded over, with ventilation beneath.

Ablution and Bath Accommodation.—This consists of a shed building with partially louvred sides for ventilation, some way off from a number of the men's rooms; fitted up with stone benches for basins, but not supplied with water. There are no baths, and the means of cleanliness are insufficient.

Cook-house.—The cook-house is a casemate containing 12 boilers and a brick oven. It has a ventilating shaft, but the means of ventilation are quite insufficient to keep it cool. It is too small for the amount of cooking in such a climate. It would improve this cook-house to provide it with steel boilers and oven.

Women's Wash-house.—This is in a casemate, and is fitted up with boilers and washing benches. Linen is dried in the barrack square.

Water Supply.—Derived partly from a brackish well in the barrack yard. For most purposes it has to be carried in buckets from tanks some distance off.

Latrines, Urinals, and Drainage.—The latrines are in a casemate tolerably ventilated. They consist of a deep trough flushed out with water, but water does not stand in it. The urinals are in the same place; both are drained direct to the sea. The construction is not good, and the arrangements are offensive. Like the other barracks, these require properly constructed water latrines with water laid on. A Macfarlane's or Jennings' latrine, raised above the level of the ground to afford sufficient fall to the sea, should be introduced.

The drainage of the barrack yard is not good on account of the surface being gravelled instead of flagged, and from the same circumstance it was not so clean as it might have been.

There is a town sewer passing under the barracks to the sea, which burst and flooded the yard some two years ago. This will be prevented in future when the proposed drainage works are completed.

Cleansing.—In this barrack also the refuse is collected in iron boxes and removed daily.

Married Soldiers' Quarters.—None, except barrack rooms, a number of which were misappropriated for married quarters at the time of our inspection; and the men were consequently subject to the evils of greater overcrowding. Non-commissioned officers have quarters provided by dividing casemates longitudinally, to convert a casemate into two quarters; the rooms are very dark.

GUARD ROOM AND CELLS.—These are in casemates also; the guard room has a grate. The cells are simply four divisions of the casemate, the two back ones of which receive no direct light or air.

The casemates of Wellington Front, although somewhat better in construction than others, nevertheless afford a very inferior description of barrack accommodation. As regards sanitary defects the site is low and damp; the rooms are overcrowded, and many of them misappropriated for other purposes; they have no fireplaces, and the ventilation is very defective; there is no proper water supply; the means of cleanliness are not sufficient; the latrines are of bad construction.

There are no proper married quarters; the non-commissioned officers' rooms are not sufficiently good.

6.—MOORISH CASTLE BARRACK.

This barrack consists of a single oblong block of building under the walls of the old Moorish Castle, about 200 feet above the sea level. It is erected on a platform partly cut out of the solid rock. The exposure towards the bay of Gibraltar is free and open, but not so towards the rock, the scarped surface of which rises vertically at a few feet from the back of the building. The accommodation consists of four rooms on two floors, the upper rooms being reached by an open wooden verandah. The rooms have windows on opposite sides, admitting of free ventilation when properly made use of. The neighbouring ground is very irregular and broken up into a number of small areas which have been increased by cutting away the rock on the slopes to afford space for various structures connected with the barrack, such as cottages used as married quarters, &c. The ground adjacent to the barrack has an area of 10,544 square feet. An additional area could easily be obtained for extending the accommodation required at this point of the rock.

The following table shows what the amount of this is at present :—

Rooms.	Regulation Number of Men per Room.	Dimensions of Rooms.			Cubic Feet per Man.	Superficial Feet per Man.	Number of Men each Room should contain.	Windows.		
		Length.	Breadth.	Height.				Number.	Height.	Width.
No.		Ft. in.	Ft. in.	Ft. in.					Ft. in.	Ft. in.
1 -	20	36 0	20 2	11 3	$408\frac{1}{3}$	$36\frac{1}{2}$	15	9	5 0	3 6
2 -	20	36 0	20 2	11 3	$408\frac{1}{3}$	$36\frac{1}{2}$	15	9	5 0	3 6
3 -	20	36 0	20 2	10 0	363	$36\frac{1}{2}$	12	9	5 0	3 6
4 -	20	36 0	20 0	10 0	360	$36\frac{1}{2}$	12	9	5 0	3 6
Total -	80	—	—	—	—	—	54	—	—	—
Guard-room	—	14 0	12 6	10 0	—	—	—	2	3 9 2 2	3 2 1 0

Overcrowding.—The barrack is considerably crowded, and even at the small allowance of space per man at present given, it does not contain the force of Royal Artillery considered necessary at this point, and 32 men have to be accommodated in tents at all times, summer and winter.

The rooms, though very much better than any of the casemates, are still of an old inferior character. The lower floors are paved, and there are no fireplaces. But the position is high and airy, with ample means of natural drainage, and by judicious planning additional accommodation might be advantageously provided on this site. In such a barrack 600 cubic feet per man ought to be enough for health. Rooms 1 and 2 should have 15 men each instead of 20; and rooms 3 and 4 should have 12 each instead of 20 each. The lower floors should be boarded, and have ventilation beneath.

Ventilation.—The existing means of ventilation, both on account of the position of the barrack and its construction, are much superior to those of the casemates, but they are nevertheless deficient. The windows are much lower than the ceilings of the rooms, and leave a large unventilated space above. This defect is partly remedied by air bricks covered with wire gauze placed at the ceilings, but there are no proper outlets. This should be remedied by introducing shafts at the corners of the lower rooms, and in the middle of the roof of the upper rooms, as in Plan X., Fig. 2. There is no gas introduced : the rooms are lighted with oil lamps.

Ablution and Bath Accommodation.—There is an ablution shed with a stone bench for placing basins on, which at the time of our inspection was used as a store, and there was virtually no place to wash in. Water is not laid on, and there is no bath ; the means of personal cleanliness are thus very deficient. These defects should be remedied by introducing fixed basins, as in Plan XV., and a bath should be provided.

Cook-house.—There is a detached cook-house containing four boilers and a brick oven. It has windows on three sides and roof ventilation. The means of cooking are said not to be sufficient, and there is no water laid on. The new steel boilers and oven, Plan XVIII., should be introduced.

Women's Wash-house.—None.

Water Supply.—All water has to be carried up to the barrack ; the quantity allowed is $2\frac{1}{2}$ gallons per man per day, except on Saturday, when 200 additional gallons are provided for the barrack. Water should be laid on as soon as the works at this end of the rock are completed.

Drainage.—The surface drainage is by no means good ; the paving, such as it is, is very rough, and foul water was lying about at the time we were there. Indeed the entire drainage of this part of the rock requires reconstruction, and to be connected with the town drains. The drainage from the Castle prison comes through the hill side and creates nuisance close to the barrack and married quarters.

Latrines and Urinals.—One of the latrines is said to be drained. Others are over cesspits, of which one is emptied by lifting a trap door in front of the seats. This latrine is built against the slope of the hill at a short distance from the barrack, and the soil percolates through the wall. The whole of the latrines are in a most offensive condition, and require entire reconstruction on Macfarlane's or Jennings' plan, with water laid on and drainage.

There are two urinals ; one close to the kitchen, and the other in an open exposed situation ; neither have water for cleansing. They should be reconstructed on Plans XIII. or XIV. in a proper position.

Married Quarters.—These consist of a number of small one-story cottages, belonging to a committee of the Royal Artillery, who collect rents and perform repairs and improvements when the fund admits of it. Some of these cottages have paved floors, some have wooden floors. The general condition of some of the quarters is good, but others are bad. The rents vary from 4*s.* 3*d.* to 2*s.* 6*d.* per month. Their only source of water supply is from rain collected in tanks, but the amount is insufficient for summer use.

The staff serjeants' quarters are many of them very good.

The latrines belonging to the married quarters are over cesspits, which cost from 12*l.* to 15*l.* a year to empty. There is a sewer close at hand into which they could be drained. The drainage and water supply of these quarters should be considered along with those of the barracks.

Ashpits are emptied chiefly by the town scavenging department. Iron boxes should be used instead.

The tailors' shop has no ventilation.

There is a general complaint of want of workshops and other means of recreation.

There is only a ball court.

Guard Room and Cells.—The guard room is rather small. It has windows on two sides, but no other means of ventilation. The cells are on the opposite side of the road. They are small; have paved floors, and they are not sufficiently ventilated.

Royal Artillery School.—This building is on a lower level than the Moorish Castle barrack, and is situated at some distance from it to the south. It has windows on opposite sides and ventilation in the roof, but not sufficient; inlets at the eaves are required besides. The floor is flagged instead of being boarded. The regulation desks and forms are not supplied, and the accommodation is too small.

The girls' school has to be held in a hospital marquee pitched outside. The best thing to do in this case is to build a sufficient school on the site, a proposal which has been already made.

It will be seen that these barracks are defective in several important requirements for health. The chief of these is want of water and drainage, cesspits, bad latrines, no suitable means of personal cleanliness, defects in paving, and surface drainage; want of workshops, insufficient ventilation generally; overcrowding, and want of barrack accommodation commensurate with the requirements on the spot. The sanitary defects should be removed, and the barrack extended on the principles we have laid down, to afford the required accommodation.

7.—GUNNERS BARRACK.

This building is situated near the garrison library in a central part of Gibraltar. It is chiefly occupied by detached men of the Royal Artillery. The orderly room of the Royal Artillery and other offices, a library and reading room, dispensary, and examination room are in the same buildings. The situation is a confined one, and there is a small court yard having an area of 2,995 superficial feet, surrounded by buildings, out of which the various offices and rooms are entered.

On the ground floor are the medical offices and a store; dark, damp, and without sufficient ventilation. On the first floor is the library and reading room, and the upper floor is divided longitudinally by a partition with openings through it. One of the divisions is used as a tailors' shop, and the other as a barrack room for 10 or 12 men. The following are the dimensions of the principal rooms:—

Rooms.	Regulation Number of Men per Room.	Dimensions of Rooms.			Cubic Feet per Man.	Superficial Area per Man.	Number of Men each Room should contain.	Windows.		
		Length.	Breadth.	Height.				Number.	Height.	Width.
Nos.		Ft. In.	Ft. In.	Ft.		Ft. In.			Ft. In.	Ft. In.
1, 2, 3 each*	—	41 8	12 0	12	—	—	—	-	—	—
4	12	41 8	12 0	11	500	41 8	10	4	3 4	3 0
5	12	41 8	12 0	11	500	41 8	10	4	3 4	3 0
Total -	24	—	—	—	—	—	20	—	—	—
Guard Room -	—	13 0	12 6	11	—	—	—	2	3 9 2 1	3 3 3 0

* Used as Dispensary, Library, Reading Room.

Overcrowding.—These rooms should not contain above 10 men each at the outside. With so small a number of men in the barrack, 600 cubic feet per man should be sufficient, with free ventilation.

Ventilation.—The ventilation of the barrack room is common to that of the crowded tailors' shop, and as there are no sufficient ventilating arrangements the places are always more or less unwholesome. The openings between the rooms should be closed, and each room ventilated separately by shafts carried up through the ridge, and by inlets at the eaves. There is no fireplace in the barrack room.

The library and reading room, though lighted with gas, have no ventilation. They require shafts carried above the roof and inlets at the ceilings. These rooms are very low in the ceilings.

Lavatory and Bath Accommodation.—There is none at present. A shed under the guard-room is intended for an ablution room. It has slate troughs, and is now used as a woman's wash-house.

Cook-house.—The cook-house is in the yard, and is supplied with three small boilers and a brick oven. Cooking said not to be sufficiently varied. The new steel boilers and steel oven should be substituted for the present apparatus.

Water Supply.—No water laid on. There is a water tank.

Latrines, Urinals, and Drainage.—One of the town sewers appears to pass under part of the barrack. The surface drainage is bad on account of defective paving. The latrines are merely flushed troughs; the place where they are is dark and dirty. The drainage requires to be improved in connexion with the general system of town drainage. The latrines should be reconstructed on Macfarlane's or Jennings' principle. The barrack refuse is removed daily.

Guard Room.—The guard room has perforated zinc ventilators. It is provided with a wooden floor.

Married Quarters.—The only married quarters are those for families of clerks in the orderly room.

The defects in Gunners barrack are, close position, want of ventilation, no suitable water supply, defective paving and bad surface drainage, no ablution accommodation, and bad latrines. Probably the most satisfactory arrangement to make as regards this barrack would be to provide for the men it is intended to contain in the enlargement of the barrack we have proposed at the Moorish Castle, and to convert the Gunners barrack into married quarters.

8.—Town Range Barracks.

These barracks are situated in the town of Gibraltar. They consist of two long narrow blocks of building, placed in line and forming part of the side of a narrow crowded public street. The blocks are separated by a centre building in which are situated officers' quarters, the school room, orderly room, guard room, &c. The rock behind the barracks has been scarped to afford sufficient space for a narrow yard behind each barrack, the area of both yards being 17,622 square feet. These yards are separated one from the other by a wall, and up the face of the rock are placed the cook-houses, latrines, some of the married quarters, stores, workshops, &c., on narrow areas of ground cut out for the purpose. The barracks are about 45 feet above the sea level, and the rock itself rises immediately behind them by a very steep slope to a height of 1,200 or 1,300 feet, cutting off all ventilation on that side. The houses on the side of the street opposite the barracks rise as high as the roof and cut off the sea breeze from them. The site is a bad one, and cannot in any way be improved.

The barracks are partly occupied by infantry, partly by engineers. Each block is in two floors. The entrance to the rooms is from the narrow court yard behind, under an open verandah of stone, over which is an open wooden terrace and verandah reached by flights of stone stairs. The rooms are entered directly from the open air, and the lower floors, which are flagged with stone, are on the level of the court yard behind, although, on account of the fall of the ground, they are raised above the level of the street in front. The floors of the upper rooms are of wood.

The rooms as a whole are not good. They are dull and cheerless on account of their position, and they are very much overcrowded, as will be seen by the following table of accommodation:—

Rooms.	Regulation Number of Men per Room.	Dimensions of Rooms.			Cubic Feet per Man.	Superficial Feet per Man.	Number of Men each Room should contain.	Windows.		
		Length.	Breadth.	Height.				Number.	Height.	Width.
Nos.		Ft.	Ft. In.	Ft. In.					Ft. In.	Ft. In.
1, 2 each -	20	38	20 0	10 10	411$\frac{13}{20}$	38	12	7	6 0	3 10
3	20	36	20 0	10 10	390	36	12	7	6 0	3 10
4	20	38	20 0	10 10	411$\frac{13}{20}$	38	12	7	6 0	3 10
5, 7 „ -	20	38	20 0	10 10	411$\frac{13}{20}$	38	12	7	5 6	4 0
6	20	36	20 0	10 10	390	36	12	7	5 6	4 0
8	20	38	20 0	10 10	411$\frac{13}{20}$	38	12	7	5 6	4 0
9, 10, 11 „ -	20	38	20 0	10 10	411$\frac{13}{20}$	38	12	7	6 0	3 8
12	20	36	20 0	10 10	390	36	12	7	6 0	3 8
13, 16 „ -	20	36	20 0	10 10	390	36	12	7	5 7	3 9
14, 15 „ -	20	38	20 0	11 6	437	38	12	7	5 7	3 9
Total -	320	—	—	—	—	—	192	—	—	—
Guard Room 4 cells each -	—	22	11 6	12 0	—	—	—	2	5 3	3 0

Overcrowding.—Each room contains a third more beds than it ought to hold in accordance with the new regulations for home stations; but it would be much safer in such a locality and climate to reduce the numbers to 12 beds per room, which would give less than 700 cubic feet per bed. Such a reduction would improve the health of the troops most materially.

Ventilation.—Each barrack room has windows on two opposite sides. There are no fireplaces. The ground-floor rooms have no special means of ventilation, although a very curious substitute has been provided. The windows are all too low to permit the space under the ceilings to be ventilated any way except through chinks in the boards into the rooms above. The upper part of the windows for six or eight inches in depth is however louvred with wood, but as the glass frames, which open on hinges, are made to fit the window from top to bottom, they of course cover the louvres when they are closed. So that when the windows are open the louvres are also open, when they are not required, and when the windows are closed and at the time when the louvres are required, the louvres are closed also. The louvres diminish the light and are of no use whatever for ventilation. Each lower room requires louvred shafts carried from the corners above the roof of the barrack, as in Plan X., and inlets at both sides. These should be obtained by independent openings close to the ceiling, and the louvres in the windows should be removed to increase the light.

The upper rooms have an open roof, and the division wall between two adjacent rooms is not carried quite up to the top. Over this vacant area a large square louvre is carried up above the roof and affords sufficient outlet; but there are no inlets except the wooden louvres over the windows, which, as already stated, are open only when the windows are open. In these upper rooms, independent inlets for fresh air should be made on both sides under the eaves, and the louvres over the windows should be removed. The rooms are lighted with gas and require the burners to be ventilated.

The stone floors of the lower rooms should be changed for boarded floors with ventilation beneath.

Ablution and Bath Accommodation.—There are three ablution sheds, one for one division of the barrack, and two for the other division, situated in the yards behind. They have lean-to roofs and louvred sides. There are stone benches for basins; but no water laid on: there is a pump in the yard from which water is obtained. Foul water is removed by a small surface drain to the main sewer. There are no baths. The means of cleanliness are deficient. The ablution sheds should be provided with fixed basins, as in Plan XV.

Cook-houses.—There is a cook-house for each wing, built on the rock above, and reached by a stone stair. The buildings are octagonal shaped with the chimney in the centre. In each there are four boilers and one brick oven, and the ventilation is ample. But great saving of fuel would result from substituting the new steel boilers and oven for the present cooking apparatus. Water for cooking has to be carried.

Women's Wash-house.—This is of the usual construction, and has only a grate and boilers, but no fixed tubs or other conveniences. Washing is said to be done by the married people at their own quarters.

Water Supply.—In each yard there is a large tank filled with rain from the roofs for supplying the barracks. These tanks are so placed as to be very liable to pollution from surface drainage falling into them. The manholes into the tanks should have raised curbs all round, the covering stone should fit very closely, to prevent as far as possible the influx of foul surface drainage, and the rain water should be passed through a filter before entering the tank. In one of the yards there is also a well yielding brackish water unfit for use. There is of course no water laid on for any purpose. The source of the supply and its means of distribution are alike objectionable.

Drainage.—The courts are paved with rough boulders, and are in a very bad condition Water lies among the stones and it is impossible to keep the surface either dry or clean. There are large offensive gulley grates in the middle of each court, which are dangerous neighbours at all times, but especially when west winds prevail, and blow up the ends of the sewers. When this happens sewer air is poured into the barrack yard.

The courts require flagging and channelling to the gulley grates, and these again should be reconstructed and properly trapped so as to prevent nuisance.

The general drainage of these barracks and of the district has been bad for very many years, and appears to have had no inconsiderable influence in determining the outbreak of yellow fever in 1829, the first case of which appeared in the district above the barracks, which was drained into a main sewer loaded with filth, into which the barrack was also drained.

This is one of the weak sanitary points of the town, although there are the most ample facilities for carrying out a perfect system of drainage, if they be only taken advantage of.

Latrines and Urinals.—There is a set of these for each barrack, built on the rock behind, near the cook-houses. They have the usual defects. The troughs are deep, and water does not stand in them. They are in fact not supplied with water, as all the water allowed to cleanse them is brought in commissariat carts, and carried to the latrines by hand labour. Consequently the latrines are imperfectly washed out without being really flushed, and the filth is carried into unflushed main sewers with which the barrack gulley grates communicate. The buildings are dark, not sufficiently ventilated, and the whole arrangements most offensive. In this as in other cases improved latrines and better drainage are contingent on a better water supply. Macfarlane's or Jennings' latrines, Plans XII. or XIII., should be substituted for the existing troughs, divisions and half-doors provided for the seats, and the buildings should be better ventilated and lighted.

The urinals are close to the latrines, and require reconstruction with impervious material, and a water supply, as in Plans XIII. and XIV.

Cleansing.—There are no ashpits. Iron boxes are used instead, and the refuse is removed daily.

Married Soldiers' Quarters.—These are partly in small cottage buildings on narrow ledges in the rock above the barracks, partly in barrack rooms which are occasionally misappropriated for the purpose. They vary in character, some are not so good as others. In one instance the ventilation from the tailors' and shoemakers' shops comes out on the level of the cottage floors directly under the doors and windows. This admits of remedy by ventilating the shops at the ridge, and closing up the present openings.

The serjeants' rooms in the barracks have no fire-places and no ventilation. There is a good serjeants' mess, with kitchen, ventilated through the roof.

School Room.—There is a good new school room in the centre of the line of building, with sufficient roof ventilation. It has an old pattern grate and requires a ventilating one. The adjoining schoolmaster's quarter is dark and not good.

Workshops.—The provision of workshops is not very good. One of the armourers' shops is too small. The tailors' and shoemakers' shops are built against the rock. All require ventilation.

Guard Room and Cells.—The guard room has an old pattern grate. The ventilation is deficient. The cells are close under the rock; all are dark. The inner ones have no light whatever from without, are very bad, and unfit for occupation.

We may sum up the sanitary defects of the Town Range barracks as follows:—

Unfavourable position, bad drainage, and rough defective surface paving, overcrowding, deficient ventilation, stone floors in lower rooms, no fireplaces, bad latrines and urinals, bad water supply, insufficient means of cleanliness.

9.—HARGREAVES BARRACKS.

This barrack, at present occupied by the Royal Engineers, is situated at the south end of the town of Gibraltar, close to Charles V. wall, at an elevation of about 65 feet above the sea level. It consists of two parallel blocks of building projecting from the hill side at right angles to its plane, with the parade ground, 3,465 feet in area, between them, and overlooking the town below. Both blocks are two floors in height towards the parade ground, but on account of the nature of the ground the northern block has a floor below the level of the parade ground, occupied as a school room, store, &c.

The ground floor on one side the parade ground is occupied by the guard room, lock-up, reading room. The ground floor on the opposite side is used as a dining room and a barrack room. These have flagged floors several inches below the surface level of the barrack yard outside; but being built against the main escarp of the town, they are considerably above the level of the ditch. They are cold and damp, especially in winter. The principal barrack rooms are on the upper floor of both blocks. They are reached by wooden terraces on the level of the roadway which passes between the barrack and the hill side behind. Each room occupies nearly the whole upper floor, and has a serjeants' room at one end.

One of the rooms has five windows on each side. It is carried up into the roof and has a dormer window above. The other room has windows at each end and along the sides; only the windows facing the north are glazed. Those on the south side have wooden shutters only.

The following table gives the accommodation :—

Rooms.	Regulation Number of Men per Room.	Dimensions of Rooms.			Cubic Feet per Man.	Superficial Feet per Man.	Number of Men each Room should contain.	Windows.		
		Length.	Breadth.	Height.				Number.	Height.	Width.
No.		Ft.	Ft. in.	Ft. in.					Ft. in.	Ft. in.
1	60	108	18 6	12 6	378	$31\frac{3}{10}$	37	8	4 10	3 0
								2	2 6	3 0
								5	4 6	3 0
								1	3 0	3 0
								2	2 2	2 6
2	40	73	18 6	17 0	576	$33\frac{1}{3}$	38	12	5 0	3 2
3	20	50	18 0	9 4	$406\frac{5}{10}$	45	13	1	3 0	3 10
								2	2 2	1 6
								3	4 6	3 7
								2	4 3	2 6
4	11	25	18 0	9 4	368	40	6	2	4 6	3 7
Total - -	131	—	—	—	—	—	94	—	—	—
Guard-room -	4	18	15 0	8 9	—	—	—	2	5 0	3 2
Cells, 4 - -	—	7	5 0	7 0	245	—	—	-	- -	- -

Overcrowding.—This barrack from its construction and local position, whereby it is freely exposed to the breeze and easily ventilated, ought to be healthy with 600 cubic feet per man. We should propose this amount, and to allot the men as follows; No. 1 room 37 men, No. 2, 38 men, No. 3, 13 men, No. 4, 6 men, instead of the present numbers. The four cells would have hardly space enough for one man if they were all thrown together.

Ventilation.—The room with the open roof and dormer window is well ventilated. The other room with the ceiling has four ventilators ending in louvres above. This room is not so well ventilated as the other, and requires inlets along each side and at the ends close to the ceiling. The rooms have no fireplaces. They are lighted with gas, the burners of which require ventilation to remove the products of combustion.

The men's room and dining room, on the ground floor, require shafts carried above the level of the roof. The ground floor rooms, which are paved, should have boarded floors with ventilation underneath.

Ablution and Bath Accommodation.—The ablution room is a very uncomfortable wooden shed erected at the end of the parade ground. It has stone benches and louvred sides, but no bath. Water is obtained from a tank in the middle, and the waste water runs into the privy drain to assist in flushing it. The present arrangements are insufficient for cleanliness. The place ought to be entirely re-constructed, as in Plan XVII., and a bath at the same time provided.

Cook-house.—There is an octagonal cook-house with six boilers and a brick oven, in so bad a state of repair that it has had to be pulled down. The new steel boilers and oven, Plan XVIII., are required.

Women's Wash-house.—This place has boilers and a stone bench to set tubs on, but no other conveniences.

Water Supply is derived from a large tank behind the serjeants' quarters, and a smaller one in the yard. The supply is insufficient, and it is not laid on. The water should be passed through a filter before it reaches the tank.

Drainage.—The paving and surface drainage of the court were both defective. The surface is roughly paved and insufficient for permitting the water to run speedily away. There is also an open offensive gulley grate at the end of the court.

Privies and Urinals.—The privies are situated in a small court at the end of the north barrack block and below its level; they are simply troughs over a drain 14 or 15 feet below. They are most offensive and unwholesome, and require entire reconstruction on Macfarlane's or Jennings' plan. The urinals are outside, and are better cleansed than many others.

Cleansing.—All refuse is collected in iron boxes and removed daily.

Married Quarters.—These are situated a little above the barrack, on the opposite side of the road. They are much better than usual, but by no means what they ought to be. The latrine belonging to these quarters is badly constructed and offensive.

School Room.—The school is under the northern block at a lower level. It is in an unhealthy position, as the earth of the barrack square is against its back wall. The school has an ordinary grate, and there is a ventilating opening into the chimney and another outlet into the orderly room above; this should be closed, and a proper outlet shaft 10 inches by 12 inches should be carried above the roof of the barrack, and a large-sized Sherringham's ventilator put in the outer wall close to the ceiling, to serve as an inlet.

Workshops.—The tailors' shops are in the same situation as the married quarters; they require ventilation.

Reading Room.—The reading room, which is entered from the barrack square, is not a very good room. It has no ventilation and requires a shaft, and inlets on opposite sides.

Guard Room, Lock-up, and Cells.—The guard room has no ventilation except the air which comes through a perforated shutter. It requires a ventilating grate and a shaft through the roof. The lock-up has only a ventilating beam carried along the roof; it requires a shaft in addition. There are four small cells at one end of the yard below the level of the roadway. They are ventilated, but so very small as to be unfit for their purpose. They have each only 245 cubic feet of contents.

Hargreaves barrack has, perhaps, the best rooms of any barrack in the town. It is well exposed to the winds, and every part of it requiring ventilation can easily be ventilated.

Its chief defects are, bad drainage and bad latrines, insufficient means of cleanliness and insufficient water supply, defective surface paving and drainage of the barrack square; want of proper cooking arrangements, want of fireplaces and of wooden floors on the ground-floor rooms.

This is the last barrack within Charles V. wall, and before proceeding to describe those outside the wall, we shall notice briefly the neutral ground camp and the detached guard rooms in the north division.

10.—Neutral Ground Camp, and North Division Guard Rooms.

There is an encampment on the Neutral Ground, consisting partly of old wooden huts, and partly of tents, occupied by men engaged in rifle practice. The huts are many of them of a very miserable description, and hardly fit for occupation. Some of the worst of them are tenanted by married people, and afford about the most wretched accommodation anywhere to be met with. It is hardly possible to improve them. All that can be done is to see that the ground about them is kept perfectly clean and well drained, and that the huts are ventilated and frequently limewashed. Better accommodation should be afforded both for the troops and married people at this point, with as little delay as possible.

Main Guard.—This building is in the middle of the town. The men's guard room is of a good size, with a verandah in front, windows and openings into a yard behind. There are no special means of ventilation. It requires a shaft, inlets, and a remodelled fire grate. There is room for non-commissioned officers.

The lock-up is in the yard behind, and there are three large cells in the same place used for civilians as well as for military prisoners. These have paved floors and guard beds. A police officer lives on the spot.

The latrine and urinal are of the usual form; they require reconstruction on Macfarlane's principle.

North Front Guards.—There are a number of these; some with prisoners' rooms, some without. All have fireplaces to enable the men on guard to cook. The grates are of a very rough construction, and waste much fuel. A proper fireplace with oven should be provided for each of these guard rooms, as the men must cook at them. Grates similar to those made for married quarters, or, rather larger, like those put up in the Woolwich guard rooms by Messrs. Benham, would be suitable. The floors are paved, and the pavement under the beds is often rough and dirty. The beds do not fold up, and the space beneath cannot be properly cleaned. There is generally no glass to the windows, and no means of ventilation when the shutters are closed. They require louvres in the roof. Water is carried by carts. The latrines are all bad, and require re-construction, and there is a general deficiency of means of ablution.

These guard rooms require good ventilation, cleanliness, and means of cooking.

11.—Jumpers Bastion.

This is a recently-constructed work projecting beyond the line wall, between the Ragged Staff and Careening bay. It is built on the water level, and as the ground immediately behind it rises to some height above the sea, the whole work is below the level of the ground on the land side, and is in fact a deep well, the area of which is about 1,000 square feet, without free circulation of air, out of which the casemates are entered. The battery is over the rooms.

There are 6 men's rooms built into the works on the sea face, besides a number of shorter casemates used for cook-houses, latrines, &c. The men's casemates are 60 feet in length, measured from the door to the end wall. Each has a door with a window on either side, and a circular opening over the door. There are loopholes at the further end. There are no fire-places, and the floors are flagged. Being under the terreplein of the rampart, and close on the sea level, the whole of the rooms are damp in winter, and their occupants are continually exposed to injury from this cause.

The accommodation is as follows:—

Rooms.	Regulation Number of Men per Room.	Dimensions of Rooms.			Cubic Feet per Man.	Superficial Feet per Man.	Number of Men each Room should contain.	Windows.		
		Length.	Breadth.	Height.				Number.	Height.	Width.
		Ft.	Ft.	Ft.						
6 each -	32	60	19	15	$534\frac{3}{8}$	$35\frac{5}{8}$	20	2	—	—
Total -	192	—	—	—	—	—	120	—	—	—

Overcrowding.—These casemates are part of a purely defensive work, and by far the best use of them would be to consider them in this light, and not as part of the barrack accommodation; because they have not been designed and constructed in such a way as to be fit for continual occupation. If they must be occupied, there should be no more than 20 men in each room.

Ventilation.—The external ventilation of the rooms is of course very defective, so far as construction goes, but on the other hand the work is between the sea and the open hill side, and no impure drainage passes into the subsoil to increase the impurity of the air. There are no special means for ventilating the casemates. Each room requires a shaft to be carried up at the further end to above the terreplein, and the circular opening over the door should be louvred and kept permanently open, Plan XI., Fig. 3.

Ventilating grates should be introduced if the rooms are to be occupied permanently, and the ground floor flags should be boarded over, with ventilation beneath.

There is no gas. Oil is served out for lighting, but it is stated that no lamps are issued with it.

Ablution and Bath Accommodation.—The lavatory is placed in a cell which was found to be too damp for its original destination. There is a wooden bench for basins, but no bath. The means of cleanliness are not sufficient.

Cook-house.—This is in a short casemate. It contains 6 boilers and a brick oven. It is deficient in ventilation. Water is carried in by hand for all purposes.

Women's Wash-house.—A shed with louvred sides is used for this purpose, but it has no conveniences.

Water Supply.—A spring of water, proceeding from the debris on the side of the hill above, comes out at the back wall of the bastion, and is received into a small tank, whence it is drawn for use.

Drainage, Latrines, and Urinals.—The surface drainage of the court is not very good on account of rubble stone being used for guttering. Flag stone properly channelled should be substituted for it.

The latrines are in a casemate, and are over a drain into which the sea washes. This method of cleansing is very imperfect, and gives rise to nuisance. A Macfarlane's or a Jennings' latrine should be introduced and supplied with water from the spring. The urinal is in the same place as the latrine.

Cleansing.—All refuse is removed daily.

Married Quarters.—The work is too confined to admit of married quarters in it. There were, however, married people, accommodated in two of the men's casemates, thereby crowding the others.

Guard Room.—The guard room is in one of the short casemates. It has a fireplace and an ordinary pattern grate. It requires ventilation similar to the other casemates.

The lock-up room is very small for the purpose.

The removeable sanitary defects in these casemates are, defective ventilation, want of fireplaces, overcrowding, defective surface drainage, bad latrines, flagged floors.

GUARD ROOMS.—RAGGED STAFF.—SOUTH SHEDS.—NEW MOLE.

The guard rooms in this neighbourhood vary in character. The poorest of them is Ragged Staff guard. All are ventilated. The latrines of all of them are very bad. Those at Ragged Staff and New Mole are over cesspits. The latrine at the South Sheds guard room is over an open drain, and is washed out with water. There is a serjeant's quarter next to it, in which much nuisance is experienced from the latrine. In this case a water latrine should be provided, and at the other two guard rooms the privies should either be removed to a distance, or they should be drained and converted into water latrines, which could be easily done.

12.—Rosia Casemates.

These casemates are the most southern of the bomb-proof barracks in the line wall. Their position as regards the surrounding levels will be best understood by supposing that the rock at this point presented a vertical escarpment 35 feet high, with the sea-shore at its foot, and that the line of rooms had been built with their backs to the sea and their face to the escarpment, a few feet distant from it. The top of the upper floor casemates forms the terreplein of the rampart. The local position is much the same as that of Jumpers Bastion, except that Rosia casemates are deeper below the surface of the ground, and in a much closer and more damp situation. The rooms are in two floors, the upper floor being reached by a stone terrace, and the lower from a narrow sunk yard 35 feet deep, in which the air is always stagnant. The lower rooms have paved floors, and the upper rooms are boarded. There are no fireplaces. The casemates are very damp in winter.

Each room has a door with a window on each side, a fanlight over the door, and four loopholes through the outer wall. The rooms, especially those on the lower floor, are dark and very damp, and the whole place is the reverse of comfortable. It was occupied by married people at the time we were there.

The following is the accommodation:—

Rooms.	Regulation Number of Men per Room.	Dimensions of Rooms.			Cubic Feet per Man.	Superficial Feet per Man.	Number of Men each Room should contain.	Windows.		
		Length.	Breadth.	Height.				Number.	Height.	Width.
		Ft.	Ft.	Ft.					Ft. In.	Ft. In.
6 each -	12	24	18	12	432	36	6	2	5 4	3 3
								1 fanlight over door.	1 6	3 0
Total -	72	—	—	—	—	—	36	—	—	—

Overcrowding.—Considering their position, these rooms are greatly overcrowded. The remarks we have made in regard to the casemates in Juniper's bastion, apply more forcibly to these. They are indeed hardly suitable for human dwellings, on account solely of their position. If they must be occupied the inmates should be reduced to one half the regulation number.

Ventilation.—For ventilation a small shaft has been carried from above the door to the top of the work, but being at the wrong end of the room, it leaves the air stagnant at the other end where ventilation is most required, and it is of no use. The lower rooms might have a shaft from the ceiling carried up into the arched space of one of the loopholes of the room above, which arched space should be divided off from the room above, and left open to the outside. To ventilate the upper rooms, shafts should be carried up from the ends opposite the doors, or an opening made in the wall and through the soffit of the arch. Permanent louvred inlets for air should be provided over the doors. The ventilating arrangements are those shown on Plan XI., Fig. 4. Ventilating grates should be introduced into the rooms. The rooms are lighted with oil, although close to the gasworks. The lower floors should be boarded, with ventilation beneath.

Ablution and Bath Accommodation.—None. There are open arches in which the men wash, in basins placed on stone benches. No baths. The means of cleanliness are insufficient.

Cook-house.—Is a small dark casemate with two old pattern boilers and a grate. There is no oven. As the casemates were occupied by married people the cook-house was used also as a woman's washhouse. The wet linen is hung across the narrow court to dry, thereby increasing the dampness and stagnation of the air. The improved steel boilers and oven, Plan XVIII., should be introduced.

Water Supply.—None. Water for all purposes has to be carted and carried down to the rooms by hand. Cisterns with water laid on should be provided.

Drainage.—The drainage of the small court yard is not sufficient, apparently on account of the gulley grate being too small. The court is flooded during heavy rains. This should be remedied.

Latrines and Urinals.—The latrines are on two floors and are over a drain into which the sea washes. The urinals are under the same roof. The places are close to the men's rooms, and very offensive. They require reconstruction as water latrines on Macfarlane's or Jennings' principle with water laid on.

Cleansing.—All refuse is collected and removed daily.

The sanitary defects in Rosia Casemates are, low, damp, unventilated position, overcrowding, bad ventilation, defective surface drainage, want of water, bad latrines and urinals, insufficient means of cleanliness and of cooking; damp rooms, and want of fire places.

As the place is occupied for married quarters it may be stated that the railings of the terrace are so far apart as to be very dangerous for children, who have occasionally fallen through.

13.—South Barracks.

This is a large barrack situated 130 feet above the sea level, on a spur of the rock, which juts out near the New Mole. A plateau of considerable extent has been obtained partly by levelling, partly by scarping the rock, and the position is open and exposed to all winds except those from easterly directions. The site is as healthy a one as could be obtained on the rock, but notwithstanding its advantages the principal medical officer informed us that there are more admissions from fever from South barracks than from most other barracks in the garrison. The causes of this greater liability are certainly not to be found so much in the site, as in conditions connected with the barracks themselves.

The men's accommodation is arranged in one single line of building, consisting of a centre and two wings, with a large parade ground in front. The officers' quarters are in two detached blocks of building, at the opposite side of the parade ground, but they do not interfere with the outer ventilation of the barracks. Behind the barracks is a rather narrow court yard bounded by the rock. The cook-houses, ablution rooms, stores, &c. are built in a line close under the rock, and the court yard is traversed by five parallel ranges of one-story buildings, which interfere materially with the free circulation of air behind the men's rooms, where it is so much wanted.

The barrack rooms are on three floors, and are of a very singular construction. Though nominally divided, they extend the entire length of each wing. They are 212 feet in length, by 22 feet in breadth, and are cut up into compartments by 15 arches, each 6 feet 8 inches wide, and 9 feet high, thrown across their breadth, which divide the space into 16 compartments, all connected by the archways and allowing the foul air to pass all over each floor. The practical result is that the rooms contain far too many men; that the ventilation is injuriously interfered with, and that a sufficiently free circulation of air cannot be obtained to keep the compartments healthy. Every wall constitutes an obstruction, and a more effectual method of preventing circulation of air in a given space could scarcely have been contrived. There are no fire-places. The ground floors are paved, and the ground behind is higher than the floor, and slopes towards it, so that much of the rain-fall is carried directly towards the lower floors, instead of away from them. This evil has been partly remedied by good channelling at the foot of the wall. But the only way to cure it, and to make the ground floor healthy, is to cut the earth away to the depth of at least 18 inches below the level of the floor, and to flag and channel the space carefully. The floor flags should be raised on piers with ventilation beneath, and the floors should be boarded.

The long rooms are divided into smaller ones by wooden doors or partitions in the archways and otherwise. There are altogether 22 rooms of this construction. Ten of the smaller ones are used for other purposes, and the remaining 12 are occupied as barrack rooms.

The following table gives the details of the accommodation :—

Rooms.	Regulation Number of Men per Room.	Dimensions of Rooms.			Cubic Feet per Man.	Superficial Feet per Man.	Number of Men each Room should contain.	Windows.		
		Length.	Breadth.	Height.				Number.	Height.	Width.
		Ft.	Ft.	Ft. In.					Ft. In.	Ft. In.
12 each -	58	106	22	10 6	$422\frac{5}{29}$	$40\frac{6}{29}$	40	16	5 10	3 0
Total - -	696	—	—	—	—	—	480	—	—	—

Overcrowding.—The cubic space per man given in the table includes that occupied by the partitions, and if this be deducted, the actual space per man will be reduced to little more than 400 cubic feet.

Considering its structure this barrack is very much overcrowded. At the very least 18 men should be removed from each room, allowing 600 cubic feet for the remainder; but it would be much safer to afford more space than this reduction would give.

Ventilation.—The upper-floor rooms have louvres in the roof, but no inlets for fresh air. They require a louvred ventilator in each side of each of the compartments.

The lower rooms have no ventilation, or rather they are provided with the same useless arrangement as that already described at the Town Range barracks, namely, at the top of each window frame there are wooden louvres, which are always closed when the windows are closed, and only open when the windows are open, and when the louvres are not required.

Each compartment of the ground and first floor rooms should have a shaft, carried from the ceiling above the roof of the barrack, and on the side opposite that on which the shaft is placed, there should be a louvred ventilator to serve as inlet placed in the wall over the window and close to the ceiling. These inlets should be placed on the side facing the sea, to receive the full benefit of any breeze.

The rooms are lighted with gas, and require ventilated burners.

Ablution and Bath Accommodation.—Two ablution rooms of recent construction are in the yard. They have slate benches, very much inclined, with a deep gutter between them and the back. There is no water laid on, and no bath. The ablution rooms require louvres in the roof for better ventilation, and to be fitted up with proper basins and baths, as shown in Plans XV. and XVI.

Cook-houses.—There are four cook-houses with 27 boilers among them, two brick ovens, and one iron oven. The latter is stated not to bake. The new steel boilers and oven, Plan XVIII., should be substituted. The cook-houses require ventilation through the roof by shafts 12 inches square.

Women's Wash-houses.—These are open sheds with boilers. They were formerly ablution sheds. One of them has been converted into a canteen, a narrow and very comfortless place. The wash-houses require fittings.

Water Supply.—Water for the use of the barracks is obtained from four tanks and four wells. It has all to be carried by hand. The water should be passed through a filter before entering the tanks.

Drainage.—The barracks are drained by a sewer to Rosia bay. The surface drainage of the courts behind is defective on account of the rough nature of the pavement. Rapid passing away of all surface water is absolutely necessary in these yards, and it would be well to pave them with close-fitting square sets at the earliest opportunity. The gratings are said to be trapped.

Latrines and Urinals.—The latrines are of the ordinary construction. The buildings are dark, and without sufficient ventilation. There is no water for the troughs; all has to be carried by hand. The urinals are under the same roof, and the whole arrangements are offensive and unwholesome. They require reconstruction on Macfarlane's or Jennings' principle, with water laid on.

Married Quarters.—This class of accommodation is very deficient in amount, and, as already stated, Rosia casemates were used for married people at the time we were there. The buildings running across the barrack yard behind are partly devoted to this purpose. These are on the ground floor, the floors are flagged, the rooms are back to back, without thorough ventilation. They have fireplaces, and gas is laid on. All the rooms require louvres in the roof for ventilation, and boarded floors. The quartermaster serjeants' quarters also require ventilation. The serjeants' mess is over the kitchen, and requires thorough ventilation to keep it cool.

Reading Room.—A portion of one of the upper-floor barrack rooms has been made into a reading room. Ginger beer, coffee, and writing materials are sold in it to the men, and the profits pay for the newspapers. The accommodation, although not of a very attractive kind, is very much appreciated by the men.

Schools.—The reading room is used also for a school, but a chapel school is being built. There is an infant school in the back yard. It has a stone floor and no ventilation. It opens into the schoolmistress's quarter.

Guard Room and Cells.—The lock-up and guard room are on each side of the entrance. They have fireplaces and paved floors. The guard bed is fixed, and cannot be kept clean beneath, and the space becomes a receptacle for dirt.

The cells are in the back yard. They are very small. The floors are paved, and the cells have openings for ventilation.

The cardinal defects of these barracks lie in their construction, want of ventilation, and great overcrowding. These are the causes to which the fever cases are mainly attributable. The privies are bad. There is no proper water supply. The surface paving of the back court is defective, and the surface of the ground is above the level of the lower room floors, which are flagged instead of being boarded. There are no fireplaces. Almost every corner of the buildings and outhouses requires ventilation.

The latrines belonging to the officers' quarters are a great nuisance from want of water. They should be reconstructed as water latrines on Jennings' principle. And the officers' mess is, at times, intolerably hot from want of a verandah to shade the face of it from the sun.

14.—ROSIA BARRACKS.

These barracks consist of the upper floors of two large buildings, one of stone and bomb-proof, the other of wood. They belong to the Royal Navy and were originally built as stores, the ground floors being still used for the purpose. According to the present arrangement they can be reclaimed at any time by the Royal Navy. They are situated at the foot of a perpendicular cliff overlooked by the Naval Hospital, and about 40 feet above the sea level. The stone building contains one large barrack room, the roof of which is supported on pillars and arches forming five aisles. Between certain of the arches there are bulkheads of wood, partially dividing the area into a number of compartments in which the beds are placed. The floor is of stone, and there are windows on all sides. At the time of our inspection this room was occupied by 104 men, at about 1,000 cubic feet per man.

The wooden building is arranged in a somewhat similar manner. There are wooden pillars with bulkheads, with the beds arranged among them.

The rooms are spacious and airy, and, although not possessing all the requisites of barrack rooms, they present a favourable contrast when compared with nearly all the structures specially built as barracks in that most important element of health, free circulation of air.

The following table gives the accommodation :—

Rooms.	Total Regulation Number of Men.	Dimensions of Rooms.						Cubic Feet per Man.	Superficial Feet per Man.	Total Number of men the Room should contain.	Windows.				
		Length.		Breadth.		Height.					Number.	Width.		Height.	
		Ft.	In.	Ft.	In.	Ft.	In.					Ft.	In.	Ft.	In.
Rosia - 1	549	129	0	53	6	12	6	544⅔	30	494	28	3	0	5	4
Rosia - 2		129	0	53	6	15	6								
Rosia, Upper wood 1		140	6	31	4	11	0		43		21	3	0	5	4
Rosia, Upper wood 2		140	6	31	4	12	6								

Overcrowding.—These rooms should not have above 494 men in them to give 600 cubic feet per man.

Ventilation.—In the stone building the air is renewed solely by doors and windows. But the windows are in two ranges, one over the other, the upper ones being about 2 feet 6 inches from the ceiling. At the time we were in this room it was well ventilated, but nearly all the men were out of it, and the doors and windows were open. It would be very advisable, however, if practicable, to insert one large louvred shaft in the centre of the roof, to act as an outlet. This, with proper use of the windows, ought to be sufficient to keep the air in the room at all times fresh. There are no fireplaces, and the room is cold, damp, and comfortless in winter in consequence.

The wooden building has windows, and three large ventilators in the roof, which appear to be sufficient.

Ablution and Bath Accommodation.—There is no ablution accommodation for the men in the stone barrack, except stone benches under open arches, on which to place basins. The wooden barrack has a wooden shed building with a wooden bench for basins. No water is laid on; there are no baths, and the whole arrangements are insufficient for cleanliness.

Cook-house.—One cook-house placed close under the rock answers for both barracks. It is a brick building, badly paved, containing 12 boilers and a brick oven, which is stated not to bake. The cook-house is long, narrow, and dark, and smokes on account of its position. The new steel boilers and oven are required. All water has to be carried by hand.

Women's Wash-house.—Is at the ablution room, and is very bad.

Drainage, Latrines, and Water Supply.—The barracks are drained to the sea. The gulleys generally are trapped.

The latrines are in shed buildings placed on the side of the road opposite the barracks. They are of the usual unwholesome construction, and are so dreadfully offensive that the smell from them crosses the road at times, and becomes a public nuisance. They require entire reconstruction as water latrines on Macfarlane's or Jennings' principle.

Water Supply.—Water is derived from tanks and a well. It is not laid on for any purpose. It should be filtered before entering the tanks.

Married Quarters.—These consist of a row of small hut rooms.

Guard room.—The guard room has a small fireplace and a rough paved floor. The cells open into a yard and are ventilated. There are married quarters attached to the guard room.

The chief sanitary defects in Rosia barracks are, the bad state of the latrines, want of water supply, dampness in consequence of want of means of warming in winter, defective cooking apparatus, deficient means of personal cleanliness.

15.—Buena Vista Barrack.

These barracks occupy one of the finest sites on the rock. They are on a plateau 230 feet above the sea, having beautiful prospects in every direction and freely exposed to the winds on all sides. The men's rooms are in a single block, divided up the centre by a wide roomy staircase. The lower-floor rooms are entered directly from the parade ground by a door at each end of the room, and the rooms above have one door each opening on an outside terrace, which is reached from the staircase already mentioned. The block of building is bomb-proof, and the rooms are casemates, which from their position and construction are by much the best casemated rooms in the garrison. The lower rooms are paved, the upper room floors are of wood.

The following table gives the statistics of the accommodation :—

Rooms.	Regulation Number of Men per Room.	Dimensions of Rooms.						Cubic Feet per Man.	Superficial Feet per Man.		Number of Men each Room should contain.	Windows.		
		Length.		Breadth.		Height.						Number.	Height.	Width.
		Ft.	In.	Ft.	In.	Ft.	In.		Ft.	In.				
Nos. 1, 3, 4, 6 -	37	61	4	18	0	14	6	432⅔	29	10	26	—	—	—
Nos. 2, 5 -	36	61	4	18	0	14	6	444⅔	30	8	27	—	—	—
Nos. 7, 9, 10, 12	33	55	4	17	10	16	6	490⅓	28	5	27	—	—	—
Nos. 8, 11 -	32	55	4	17	10	16	6	508⅔	29	4	27	—	—	—
Total -	416										320			

Overcrowding.—These rooms ought to be healthy with about 600 cubic feet per man, and to give this amount, rooms Nos. 1 to 6 would accommodate 26 men each and the remaining rooms 27 men each.

Ventilation.—The lower rooms are provided with two doors having semicircular sashes over them, and two windows at each end of the room. The upper rooms have one door with a fanlight over it, and a window on each side of the door, and at the opposite end of the room are three glazed windows. The beds are arranged along the dead walls. The windows are too low to be of much use for ventilation, and there is a large space above the top of both doors and windows which becomes filled with foul air for want of an outlet. There are no fireplaces, and no other means of ventilation.

Each room should have a shaft of sufficient area carried from the ceiling above the roof, as in Plan X., Fig. 2, or if this be impracticable, there ought to be a large opening made at each end of the room under the soffit of the arch. This opening should be provided with louvres. The floors of the lower rooms should have ample ventilation beneath.

Ablution and Bath Accommodation.—The ablution room is part of a narrow, low, one-story building on the south front of the barracks. It is of recent construction, has slate benches, but no water and no baths. There were no gratings; they were said to be broken. The means of personal cleanliness are not sufficient.

Cook-houses.—There are two cook-houses in the rear of the one-story buildings already mentioned. There are five boilers in each, but no oven. The new steel boilers should be substituted and an oven introduced. The buildings require ventilation. All water has to be carried.

Women's Wash-house.—There is one wash-house with boilers and a wooden bench for tubs, but there is no water laid on, and no conveniences. These should be provided in the manner already described.

Drainage.—The drainage of this barrack appears not to be completed, and part of it is discharged on the face of the rock, creating nuisance. This should be corrected, and the privies and other buildings properly drained.

Latrines and Urinals.—The latrines are constructed with troughs, and have the usual defects. The soil falls over the cliff and finds its way to the sea. A proper drain is being constructed. The latrines require a water supply, and they should be reconstructed on Macfarlane's principle.

Cleansing.—There is an ashpit, cleansed daily. It ought to be abolished and the refuse collected in an iron box. In wet weather water drains from this ashpit on to the surface of the parade ground.

Water Supply.—Water is derived from an underground tank, the cover of which is fitted imperfectly, allowing impurities to fall in. This defect should be remedied, and a filter provided to pass the water through before it enters the tank. The supply is insufficient, and not laid on for any purpose.

Married Quarters.—There are separate rooms inhabited by married non-commissioned officers, but there are no quarters for married soldiers.

The sanitary defects requiring removal in Buena Vista barracks are, want of ventilation, overcrowding, want of fireplaces, flagged floors, defects in drainage and latrines, want of proper water supply, insufficient means of cooking.

Buena Vista Hut Barracks.—These stone huts are situated on sloping ground below the barracks, in a place where space is very much required, and where two-story buildings might have been easily erected. As the huts are only on one floor they are very much crowded together and cover double the ground that was necessary. They are arranged in narrow parallel lines, with other huts built across the openings of the lines, thereby obstructing the ventilation. These huts were not completed when we inspected them, but they are built on an improved plan, to give 600 cubic feet per man. They have porches with space for night urinals built out from them, ventilating grates, and inlets at the eaves, but the ridge ventilation has been omitted, and the windows are too small. The designs for these huts were sent out from England, and contained the necessary sanitary details. But the selection of the site, the manner in which the huts have been arranged, and the omission of the sanitary details we have mentioned, was done on the spot, affording a marked illustration of how practical unacquaintance with sanitary principles may spoil a good design in the execution.

16.—WINDMILL HILL BARRACKS.

The troops stationed on Windmill Hill have three classes of accommodation:—1st, Windmill Hill barracks; 2nd, wooden huts; 3rd, a building called the Fuze house used as barracks for artillery. The huts and fuze house are situated on a plateau below the level of the barracks proper and at some distance from them.

Windmill Hill barracks are old badly-constructed barracks situated on a terrace of rock cut out to receive them at an elevation of 350 feet above the level of the sea The building runs about east and west, and faces nearly south. The ground slopes from it rapidly to the south, but on the north side the southern end of the lofty ridge of the rock of Gibraltar rises far above it. The terrace on which the barrack is situated is so narrow that only a few feet of space intervenes between its back wall and the rock above, and even this limited space is encroached upon by an arched verandah and terrace, where it is not only not wanted, but where it is a serious interruption to ventilation. This should be removed altogether, and a light verandah and terrace erected along the south front, where it will afford shelter from the sun, which is very much required. Besides, the freer circulation of air consequent on its removal will materially improve the ventilation of the barrack, and keep the air behind it dryer than it is at present.

The ground behind part of the barrack is on a level with the floors of the lower rooms; but a deep catch-water drain has been made at the foot of the rock to cut off the rain-fall and divert it from the barrack. It would however be highly advantageous to lower the surface a foot below the level of the floors, to dispense with the present boulder paving, and substitute for it well-fitting square stones or flags sloped from the building towards the drain.

The flagged floors should be boarded over, with ventilation beneath.

The rooms are low and narrow, with small low windows. They are entered from the verandah behind, through an interior porch common to two rooms. They are in two floors, the terrace above the lower verandah forming the means of entrance to the upper-floor rooms.

The whole barrack is very much overcrowded, as will be seen by the following table of accommodation:—

Rooms.	Total Regulation Number of Men.	Dimensions of Rooms.			Cubic Feet per Man.	Superficial Feet per Man.	Total Number of Men the Rooms should contain	Windows.		
		Length.	Breadth.	Height.				Number.	Height.	Width.
		Ft. In.	Ft. In.	Ft.		Ft. In.				
1, 2, 3, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16	402	43 2	17 2	10	288½	29 4	170	—	—	—
4, 5 - -		35 8								

Overcrowding.—If this building were thoroughly improved, each man would have space enough at 600 cubic feet. The present crowding is worse than almost any at home stations, and should be put an end to without loss of time. There is room in the present barrack for 170 men, which is the largest number it ought to contain. But the position is so healthy a one, that a considerable addition to the barrack accommodation might be constructed on the principles laid down above close to the present barrack.

Ventilation.—The present means of ventilation are doors, and windows, with a few air bricks in the walls. The windows are much too small and ought to be enlarged and carried up close to the ceiling. There are also ventilating shafts made out of disused chimneys, and Sherringham's ventilators over the air bricks in the upper floors. Louvred ventilators are required in the lower floors, and in greater number, because notwithstanding the high and exposed situation of this barrack, the rooms, partly from bad construction, are very imperfectly ventilated, even with the present means. Enlarged windows, ventilating shafts in all rooms where they do not exist at present, and more inlets near the ceiling are necessary. But with the present overcrowding, hardly any means of ventilation short of sleeping in the open air would be sufficient for health.

Ablution and Bath Accommodation.—There is an ablution room behind the barracks, built against the rock. It is lofty, but the windows are much too low down for light or ventilation. There are two small grated openings at each end which require to be very much enlarged. There are stone benches and gratings, but no water laid on, and no bath.

Cook-houses.—There are two cook-houses, one at each end of the barrack range; they are supplied with 12 ordinary pattern boilers and one brick oven. The new steel boilers and oven should be provided for each cook-house. Water is not laid on.

Latrines and Urinals.—There are two latrines, one of which is flushed out every morning through a drain to the sea, the other is over a cesspit, and most offensive. This cesspit has to be frequently emptied, and the cleansing costs about 10*l.* each time. It requires drainage, like the other down the eastern face of the rock to the sea; both should have Macfarlane's or Jennings' latrines instead of the present arrangements, and the cesspit should be abolished. The urinals are a great nuisance. They should be reconstructed on Plans XIII. or XIV. with water for cleansing.

School Room.—A school room has been recently built a little below the barracks. It is an excellent building, except that the windows are too low for efficient ventilation, for which indeed no provision has been made in the construction. There should be louvres introduced in the roof, and louvred ventilators along both sides at the eaves.

The privy belonging to the school is over a cesspit. It requires reconstruction and drainage.

Drainage.—There is a main drain from the soldiers' barracks, built of masonry and carried down the face of the rock on the Mediterranean side, where it is discharged on the perpendicular face of the cliff to the sea, about 100 feet below. Another drain proceeds from the officers' quarters, and has no proper outlet. The sewage finds its way into crevices or over the surface, and occasions nuisance. This could easily be remedied by laying a small pipe drain to the sea.

Water Supply.—Water is derived from tanks, and is not laid on for any purpose. A water filter is required.

The chief sanitary defects of Windmill Hill barracks are as follow:— great overcrowding; deficient window space and ventilation; want of drainage for latrines, &c.; cesspits; defects in water supply; verandah on wrong side of barrack; earth behind on a level with the floors; deficient means of personal cleanliness.

Hut Barracks, Windmill Hill.—At some distance below the barracks we have described there is an extensive plateau of ground occupied by a number of Crimean wooden huts, partly used as men's quarters, partly as married quarters. They are generally in such a ruinous condition as not to be fit for occupation. Many of them are not weather-tight, and require shoring up to keep them from falling on their inmates. They are said to be "frightfully hot" in summer, and cold in winter, besides being unfit for habitation in wet weather. It would be quite a useless expenditure of money to attempt to do anything with them, further than may be required to keep out rain, until proper accommodation can be provided for their occupants.

Besides the bad state of the huts everything else is either deficient or bad. The arrangements for cooking, ablution, water supply, drainage, latrines, which are over cesspits, are all of the same temporary nature as the barrack accommodation, and all require reconstruction.

The site is a fine and healthy one and would afford space for barracks for a considerable body of men.

Several brick huts are used as stores, workshops, &c. They have no ventilation, and require louvres in the roof with inlets at the eaves.

Canteen.—The canteen is within the enclosure of Windmill Hill barrack. It is a dark, dirty, uninviting place, and has a stone floor.

Guard Room and Cells.—The guard room is very small. It is ventilated through the roof, and has a fireplace. The lock-up is also small. The cells are detached from the guardroom; they are too small, and require ventilation.

The officers' stable is insufficiently ventilated.

17.—Artillery Barracks, Windmill Hill.

This building is near the wooden huts. It consists of two rooms, built in 1794, and now used as barrack accommodation. There are windows on opposite sides; the floors are paved. There are fireplaces with small old pattern grates.

The accommodation is as follows:—

Rooms.	Regulation Number of Men per Room.	Dimensions of Rooms.			Cubic Feet per Man.	Superficial Feet per Man.	Windows.		
		Length.	Breadth.	Height.			Number.	Height.	Width.
		Ft. In.	Ft.	Ft.				Ft. In.	Ft. In.
1 room -	12	37 6	18	15	$843\frac{3}{4}$	$56\frac{1}{4}$	1 2	3 0 4 0	2 6 2 6
1 room -	10	30 0	18	15	810	54	2	4 0	2 6

Overcrowding.—None. The rooms, on account of their airy position, afford space enough for their inmates.

Ventilation.—No special means of ventilation. Louvres in the ridge and inlets at the eaves on both sides are required. Ventilating fire grates should be introduced.

The floors should have ventilation beneath.

The position of the building is airy and healthy, but the ground outside is roughly paved, and the surface drainage not so good as it might be.

Ablution Room.—Is of the usual construction. Water is not laid on, and there is no bath.

Cook-house.—A small cottage building, with the floor roughly paved and dirty in consequence. Cooking arrangements consist of two boilers. No oven. Steel boiler and an oven are required.

The *Ashpit* next to the cook-house is in a ruinous state and too large: its contents are removed daily. An iron box would be much better.

Latrines and Drainage.—Merely a common privy over a cesspit. Very offensive. An open surface drain runs through the barrack yard, into which urine tubs are emptied. There is another very offensive drain close at hand which receives foul water from the kitchen. These surface drains are led to the face of the rock and their contents are discharged over to the ground below where they evaporate. They give rise to great nuisance in summer, and the effluvia from the privies can be detected all over the vicinity in certain states of the wind. A proper pipe drain is required.

This barrack requires ventilation, drainage, better water supply, entire reconstruction of privies as water latrines and better surface paving. Wooden floors are also needed for the rooms, and an improved cook-house.

18.—Defensible Barracks, Europa Point.

This is a block of bomb-proof building, consisting of four parallel casemates communicating with each other by lateral arches. It occupies an airy exposed position, about 45 feet above the sea level, and is detached from other buildings. One room is divided into a library and officers' kitchen. The floors are flagged, and there are no fireplaces. A covered verandah runs along both sides of the block. Taken as a whole the barrack accommodation is very good for a casemated building, except that from want of fireplaces the rooms are very damp and cold during winter. Oil is used for lighting.

The following table gives the accommodation:—

Rooms.	Regulation Number of Men per Room.	Dimensions of Rooms.			Cubic Feet per Man.	Superficial Feet per Man.	Numbe of Men each Room should contain.	Windows.		
		Length.	Breadth.	Height.				Number.	Height.	Width.
		Ft.	Ft.	Ft. In.						
4 rooms -	25	48	19	15 6	$565\frac{1}{2}$	$36\frac{1}{2}$	23	—	—	—
Total -	100						92			

Overcrowding.—By removing two men out of each room there will be space enough for the remainder.

Ventilation.—The position of the barrack ensures good external ventilation. There are openings under the soffit of the arches at each end, and windows exposed to every wind, but the rooms are said to be scarcely sufficiently ventilated; some arrangement for removing the foul air at night being necessary. A few additional louvred openings in the side and end walls, with a shaft through the roof of each casemate, would remedy this defect.

Ablution and Bath Accommodation.—There is an ablution room with a rough pebble floor, and stone slabs for basins, but no water supply and no bath. It requires roof ventilation.

Cook-house.—The cook-house is insufficiently ventilated, and requires a louvre in the roof. It has four boilers and a brick oven; for which the steel boilers and oven should be substituted. The meat store requires ventilation.

Latrines, Urinals, and Drainage.—The latrine is an ordinary privy over a cesspit. The urinal adjoins it. There is no drainage, and the place is most offensive. There are ample facilities for draining to the sea. The latrines and urinals should be drained, reconstructed, and supplied with water on Macfarlane's or Jennings' plan. The ablution room, cook-house, &c. have only surface drainage, and the water finds its way to the sea. A proper drain is required. Barrack refuse is removed daily.

Water Supply.—None except from a tank. It has to be carried by hand for all purposes.

Married Quarters.—There are some good quarters for married people in the neighbourhood; there is also a serjeants' quarter attached to the barrack rooms.

This barrack, notwithstanding its fine position, has recently been somewhat unhealthy, attributable mainly to deficient ventilation and the condition of the drainage. It is a little overcrowded, and would be safer with two or three fewer men per room. The ventilation should be increased, and the neighbourhood thoroughly drained. All open surface drains should be carefully cut in flagstone, with sufficient inclination to free them of water. The cesspit should be abolished, and the latrines properly constructed.

19.—New Hut Barracks, Europa Flat.

These new barracks are situated on a healthy site overlooking the sea, a little to the west of the Defensible barrack. They are built of stone, on an improved plan, to give 600 cubic feet per man, and are very good except in some minor points of detail. Some of the sites have been more or less dug out of the slope, so that the earth, although separated from the walls, rises a foot or two above the level of the floors. This should always be avoided; and the foundations raised above the adjoining levels. If, however, this advantage cannot be obtained, and sites must be partially excavated, not only should the earth be completely cut away to a sufficient distance to prevent damp, but the ground should be lowered at least a foot or 18 inches below the level of the floor, and the slopes flagged to afford rapid drainage.

The accommodation is as follows:—

Rooms.	Regulation Number of Men per Room.	Dimensions of Rooms.			Cubic Feet per Man.	Superficial Feet per Man.	Windows.		
		Length.	Breadth.	Height.			Number.	Height.	Width.
		Ft.	Ft. In.	Ft. In.				Ft. In.	Ft. In.
8 huts, 2 rooms each = 16 -	24	51	20 0	14 3	600	42½	8	4 8	2 9
N. C. Officers' rooms, 16 -	1	14	9 6	14 3	—	—	—	—	—

Each hut contains two barrack rooms with two serjeants' rooms back to back (having each a grate with an oven) between them. These rooms are 9 feet 6 inches wide, and are too narrow for comfort. An additional width of a foot or 18 inches should be given in future huts. The floors are of wood raised from one to 6 feet above the ground, with free ventilation beneath.

Each barrack room has windows along the opposite sides, rather too small in area. There are ventilating inlets along both sides at the eaves; a ventilating fire grate, and ridge ventilation along the roof. The ridge appears to be hardly sufficiently raised, at least for summer, in such a climate. Any deficiency of ventilation can, however, be easily remedied.

Ablution and Bath Accommodation.—There is a large ablution room of the recent regulation pattern, with slate benches and water taps, with water laid on. It is paved and ventilated, but requires pegs. Crockery basins are issued to the men, but are apt to be broken. There is no bath, but one for salt water is about to be put up on trial.

Cook-house.—There is a large cook-house, lighted and ventilated, containing an improved Benham's apparatus intended for the whole hut encampment, which was originally designed and ordered to be built for 1,000 men. The local authorities only erected huts for 400 men on this site, and placed the others at Buena Viata. The cooking apparatus for 1,000 men was nevertheless put up at Europa flats, and is used for about 400 men, consuming about 320 lbs. of coal a day while cooking for that number. The quantity of fuel is hence much larger than would be necessary with improved steel boilers and ovens, or than would have been necessary with the present one had it been used for the number of men for which it was intended. Unless the barrack accommodation is to be extended on this site, it would be better to remove the apparatus to a barrack where the full number of men could be cooked for, and to put up the improved steel boilers and ovens instead.

Drainage.—All the fluid refuse of these huts is conveyed to the sea by underground drains, trapped, to an outlet 200 yards distant, formed of a curved iron pipe, which drops the sewage under the surface of the water.

The drainage of the officers' quarters, which are in a large old house at a short distance, is not good.

It is led to a crevice in the rock and there discharged. It requires examination and improvement, and to be conducted to the sea.

The roof of the officers' quarters leaks and requires repair.

Latrines.—Macfarlane's latrines have been erected, but there was not water enough for them. This defect was about to be remedied by raising water from the sea.

Water Supply.—Derived from a tank. It is insufficient in amount. The water should be passed through a filter before entering the tank.

These hut barracks are still incomplete and require gas for lighting, a day and reading room, and other conveniences. There are no married quarters as yet.

20.—BREWERY BARRACK, EUROPA POINT.

This is a building originally intended for a brewery and not fit for a barrack. It forms three sides of a square. All the paving about it is of rough boulders, very bad and quite insufficient for surface drainage. The rooms are shed buildings, resembling the temporary accommodation available on field service rather than a place where troops should be permanently barracked.

The rooms on two adjacent sides of the square are used as barrack rooms. They have windows on both sides. One room has a fireplace and the other has two. These fireplaces have the old pattern grate.

The room on the third side is divided down the centre by wooden partitions to form separate berths for married people. There is a fireplace at one end of this room, and a tank has been constructed under part of it.

The passages have rough pebble pavement which cannot be kept clean. All the floors should be raised and boarded.

The following table shows the accommodation in this barrack :—

Rooms.	Regulation Number of Men per Room.	Dimensions of Rooms.			Cubic Feet per Man.	Superficial Feet per Man.	Number of Men each Room should contain.	Windows.		
		Length.	Breadth.	Height.				Number.	Height.	Width.
		Ft. In.	Ft.	Ft.						
1	40	68 6	20	13	445¼	34¼	29	—	—	—
2	40	75 0	20	13	487½	37½	30	—	—	—
3	30	61 0	20	13	528⅔	40⅔	26	—	—	—
Total -	110						85			

Overcrowding.—This barrack is overcrowded with its present occupants. Instead of the existing numbers, we would propose as follows :—Room No. 1, to contain 29 beds ; room No. 2, 30 beds ; and room No. 3, to contain 26 beds, which would give a little over 600 cubic feet per man.

Ventilation.—There are no means of ventilation except doors and windows. The latter are on opposite sides of the rooms. Ridge ventilation, together with inlets at the eaves along opposite sides of the room are required, and ventilating grates should be introduced instead of the present ones.

Ablution and Bath Accommodation.—There is no suitable ablution room. The place in use is an open shed, with benches. There is no bath, nor other convenience, and no water supply.

Cook-house.—The cook-house is at the corner of the barrack. It has a paved floor, three square boilers, and a brick oven. It requires roof ventilation, and should be provided with the new steel boilers and oven.

Women's Wash-house.—There is a place with no washing conveniences. It has an earthen floor, and is undrained.

Latrine and Urinals.—The men's latrine is a trough over the sea. Dirty water is allowed to pass through the trough. The building is too dark and requires more ventilation. The urinal is better than the most of such places, but it is close to the kitchen, and gives rise to nuisance. It should be removed to another site. The women's privy is over a cesspit. The barrack refuse is thrown on a heap close to the barrack. This is quite unnecessary and should be prevented. The refuse should be thrown into the sea.

Drainage.—The surface drainage is very bad on account of the nature of the paving. There is a main drain to the sea; it has a large untrapped opening for emptying slops into it close to the barrack rooms. This is a great nuisance and ought to be removed.

The entire drainage, including that of the surface, requires improvement. Part of it at present is discharged on the surface of the ground at a lower level and allowed to sink into the earth or evaporate.

School Room, &c.—A building erected for a store is at present used as a school. It requires a fireplace, more window space, and roof ventilation. The shoemakers' shop is in a small store, the floor of which is paved with pebbles and rough.

This place altogether is more fit for a brewery than a barrack; looking at it as it is, it requires reduction of inmates, ventilation, ventilating fire grates, wooden flooring, ablution and bath accommodation, surface flagging and draining, better latrines, better water supply.

21.—Europa Guard Rooms, &c.

Europa Point Guard Rooms.—There are several detached guards at Europa Point, which have certain defects in common. The privies are all in a bad condition and require reconstruction. The floors, generally, are covered with rough boulder pavement, instead of being boarded, and the ventilation is often deficient. They should be included in the general improvements required for the guard rooms of the garrison.

Europa Pass Sheds.—These sheds are at present occupied by married soldiers in default of better accommodation. They are either close to the rock, or are more or less under the level of the ground. They are very unhealthy, and in every way unsuitable for the purpose. The only thing to be done is to remove them altogether, a measure which would afford space for erecting a considerable number of proper quarters.

At a short distance from these sheds is a handsome new building for an infant school. But notwithstanding the very considerable cost incurred in the construction, no provision whatever has been made for ventilating it. It requires ridge ventilators and inlets at the eaves.

22.—Military Prison.

The military prison for the garrison is in two divisions, one in the Moorish Castle, the other in a special building at Windmill Hill. Both positions are healthy, but there is a considerable difference in the prisons.

The *Moorish Castle* division is close and confined in area, and the cells are some of them built against the rock.

They open on the external air. Water is derived from tanks, but is insufficient in amount, and the requisite quantity has to be carried during part of the year.

The latrine is flushed into a drain. There is an open drain and cesspit outside, which occasionally become very offensive.

The great improvements required at the Moorish Castle are drainage and water supply.

The *Windmill Hill* division is a regularly constructed prison with a central light and airy corridor, and the cells opening out of it on each side.

There are plenty of means of ventilating both corridor and cells. There is no warming apparatus. Although a subsidiary building has been recently erected, the prison is too small for the strength of the garrison, and the guard rooms are consequently crowded. 50 additional cells on the existing plan should be built with as little delay as possible.

The kitchen would require an additional boiler if this were done. But the new steel boilers should be introduced to save fuel. Here as elsewhere the drainage is defective, and should be improved, together with that of the barracks. In other respects the arrangements are sufficient for health.

23.—Detachment Barrack, Catelan Bay.

This barrack, situated close to the margin of the sea on the Mediterranean side of the rock, was destroyed by a fall of rock during a blasting operation, shortly before our visit, and the men were living in tents. It was a very bad barrack, and is to be replaced by a building more suitable for its object.

24.—Garrison Hospital, Gibraltar.

This hospital was built for the Royal Navy, about the year 1771, and has been lent to the Army since 1816, subject to certain reservations as to accommodation for commissioned and warrant officers of the navy. As the building may be reclaimed at any time by the department to which it belongs, we shall in the following report limit the improvements we have to recommend to points of immediate necessity.

The building faces the west, and occupies a platean of ground 130 feet above the level of the sea, at Rosia, in the southern division of the garrison. Its position is open to the west, and to a great extent so, to the north and south; but on the east side, towards the slope of the hill, the rock has been cut away to afford increased surface area, and as a consequence there is a section of the rock with a steep slope above it, rising as high as the roof of the hospital, a few yards only from its back wall, darkening the wards on that side, and interfering with external ventilation. Immediately over the slope the rocky heights of Windmill Hill rise several hundred feet, and cut off the winds coming from the Mediterranean; with this exception the site is open, airy, and not inconvenient for the garrison, with all parts of which it is connected by good roads.

The buildings consist of one large central block, containing the hospital proper. On the north side, and separated from it by an open space, are detached blocks of buildings used as quarters and stores; and on the south side, at a short distance from the hospital, there is a row of stores, at one end of which, close under the rock, are the hospital latrines. In the same row are stables, and also the dead house. A gateway divides these buildings in the middle, and outside it there is a separate detached block resembling, in structure, ordinary regimental cells, used as lunatic wards.

The hospital is built in a hollow square with closed angles. The outer front facing the west is 325 feet long. The outer length of the sides is 162 feet. The inner square is 145 feet long by 70 feet wide.

Outside the square at either end are two wings projecting backwards from the front to increase the accommodation, and between these wings and the walls of the square are narrow roughly paved courts. The construction is therefore not all that could be desired in point of health. It is not sufficiently simple to obtain all the advantages which might arise from the position of the buildings; and partly to this circumstance, partly to the close proximity of the high ground behind, and to defects in the drainage, is no doubt to be attributed the fact that the medical officers and hospital servants did not escape yellow fever during the last epidemic which visited Gibraltar. There are two floors of wards, one on the ground floor, the other above. Over the centre of the front there is a third floor used as quarters for sick naval officers, regimental hospital stores, &c.; and at each corner of the main building there is a third floor, forming a pavilion carried above the line of the roof, and used for sick wards, &c.

The principal entrance to the hospital is by a wide passage through the middle of the west front. A wooden terrace is carried round the inside of the square at the level of the upper floor. It is reached by four flights of stone steps, and affords the means of access to the upper-floor wards.

As originally constructed the general disposition of all the wards was as good as the plan admitted of, and closely resembled that of other naval hospitals. The wards were entered from the end, and extended from the entrance to the corners of the court, having windows on both sides, with the beds arranged along the walls between the windows, space being left for a fireplace.

The structure was simple, and allowed of circulation of air more or less efficiently throughout the building; but after the hospital was made over to the Army it was cut up into no fewer than six hospital establishments for regimental purposes. With this object wards have been divided, partitions run up, stores, kitchens, surgeries constructed, apparently without the slightest regard to the probable effect of the alterations on the ventilation of the buildings, and there are at the present time six kitchens, six surgeries, six sets of stores of various descriptions, and other offices in proportion, the existence of which is as detrimental to the health of the hospital as it is to administration and discipline.

There are at present 32 wards, numbered as 30 on the construction of the hospital, the statistics of which are given on the following table:—

	No. of Wards.	Present Number of Beds per Ward.	Length.		Breadth.		Height.		Cubic Feet per Bed.	Superficial Area in Feet per Bed.	Number of Beds at 1,200 Cubic Feet each.
			ft.	in.	ft.	in.	ft.	in.			
Ground floor.	1	—	88	0	20	0	12	0	—	—	17
	2	—	88	0	20	0	12	0	—	—	17
	3	18	53	0	20	0	12	0	706	59	10
	4	16	57	6	20	0	12	0	862	72	11
	5	—	26	0	20	3	12	0	—	—	5
	6	—	26	0	20	3	12	0	—	—	5
	7	16	56	6	20	0	13	0	847	70	11
	8	18	53	3	20	0	12	0	710	59	10
	9*	—	88	0	20	0	12	0	—	—	—
	10	—	26	0	26	0	12	0	—	—	6
	11	16	53	0	20	0	12	0	795	66	10
	12	20†	80	0	20	0	12	0	—	80	16
	13	—	80	0	20	0	12	0	—	—	16
	14	17	53	0	20	0	12	0	748	62	10
	15	—	26	0	26	0	12	0	—	—	6
Upper floor.	16	34	100	0	21	0	17	6	1,080	62	30
	17	34	100	0	21	0	17	6	1,080	62	30
	18	18	53	6	21	0	17	6	1,092	62	16
	19	18	57	6	21	0	17	6	1,174	68	17
	20	—	20	9	27	0	11	4	—	—	5
	21	18	57	0	21	0	17	6	1,163	68	17
	22	18	54	0	21	0	17	6	1,102	63	16
	23	32	100	0	21	0	17	6	1,149	66	30
	24	20	67	0	19	6	17	6	1,143	65	19
	25 Upper	10	27	0	27	0	15	0	1,093	46	9
	25 Lower	10	27	0	27	0	11	4	826	46	5
	26	16	53	6	21	0	17	6	1,229	70	16
	27	24	80	0	21	0	17	6	1,225	70	24
	28	28	80	0	21	0	17	6	1,050	60	24
	29	18	53	6	21	0	17	6	1,092	62	16
	30 Upper	—	27	0	27	0	15	0	—	—	15
	30 Lower	—	27	0	27	0	11	4			
	Total - 32	419	—		—		—		—	—	440

This table shows that out of 32 wards, 10 are misappropriated for other purposes, and that on the present allotment as to cubic space, the misappropriated wards would accommodate about 100 beds. Three of the wards will have to be taken for purposes of administration, so that the whole space added to the hospital by restoring the misappropriations will not count as increased ward space.

The misappropriated wards are occupied as follows:—No. 1 ward is subdivided into two regimental stores and a hospital serjeants' room.

No. 2 is used as a purveyors' store.

No. 5 contains a regimental surgery and waiting room.

No. 6 contains a hospital serjeants' room and a regimental medical comforts' store, with a passage between them.

No. 10 is used as a regimental surgery and hospital serjeants' room.

No. 13 is partly used as a chapel and reading room and partly as a regimental store.

No. 15 is partly used as a lobby and partly as a bedding store and orderly's room.

No. 20 is divided into a regimental surgery, an office, and an orderly's room.

The two wards, upper and lower, No. 30, are used as a regimental store, surgery, orderly's room, &c.

By restoring all these wards as hospital accommodation for sick, and allotting 1,200 cubic feet per bed, the hospital will accommodate 440 sick, a number not likely to be exceeded at any ordinary season.

Besides the proper ward accommodation there are seven rooms in the third floor of the centre of the front already alluded to; they are in reality rooms for sick naval officers, but are devoted in part to other purposes. The best of them, which would hold nine beds, is used as a hospital store by the Royal Artillery. Other two rooms are used by a hospital serjeant, and the remainder are used for officers and warrant officers of the Royal Navy, for whom they afford insufficient accommodation, and complaints have arisen in consequence.

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* A bad ground-floor ward, partly used for prisoners. It is hardly fit for occupation.

† Part of this ward is cut off for a regimental pack store. The rest is used for sick.

The sick wards differ much in character; those on the ground-floor front are good, they face the west and have free external ventilation. The back ground-floor wards are enclosed between the inner court of the hospital and the rock behind, and are of an inferior description. They are dull, and there is very little movement of the air about them. Besides these disadvantages, they are built directly across the natural fall of the drainage from the rock above, apparently without any special provision for cutting off the water, and they are liable to damp, especially in the rainy season.

The wards on the ground floor of the sides are very inferior and hardly fit for sick. They receive their ventilation chiefly from a narrow court between the ward and the kitchen, where there is an offensive gulley grate, to which disease has been traced.

The upper-floor wards are generally the best, but two wards, 16 and 17, are built alongside each other, with doors and openings through the partition wall, and four rows of beds between the opposite windows. This faulty construction appears to be the result of a later addition to the hospital.

Ventilation.—The wards are almost all more or less deficient in window space and in means of ventilation. The windows generally are placed on opposite sides of the wards, but they are deficient in height in proportion to the height of the wards, and hence there is a space of about four feet between the top of the windows and the ceilings of the rooms from which there are no means at present of giving exit to the foul air. There is generally a similar space of four feet between the sill of the window and the floor. The wards on the upper floor have their ceilings generally carried up in the line of the roof, which is boarded inside, and in most instances advantage has been taken of this circumstance to introduce ridge ventilators. In some of these upper wards there is no ventilation, and this is also the case with all the ground-floor wards. The wards in the turrets at the angles are one above the other, and are reached by a stair within the ward, so that the foul air from the wards below passes upwards into those above, and there is no ventilation in the upper wards.

Drainage.—The facilities for drainage are most ample on account of the height of the buildings above the sea level.

The surface drainage and paving admit, nevertheless, of considerable improvement, especially in the narrow spaces between the buildings. The present imperfect paving should be relaid with flags, the channels for surface water carefully formed, and all the gulley grates trapped. The present rough paving renders proper surface drainage almost impossible.

Water Supply.—The water supply is derived from three sources; the roofs of the hospital, wells, and surface drainage. Water from the former source is stored in two underground tanks capable of holding 50,000 and 56,000 gallons respectively; it is used for the ordinary service of the hospital. The surface drainage, which is collected from the hill side above and behind the hospital, is stored in two small tanks, and is chiefly used for flushing the privies. The quantity is very limited, and in dry weather, that is during a great part of the year, the flushing cannot be done. Water for washing is obtained from two wells, but the supply is limited, and has to be raised and carried by fatigue parties.

The arrangements are very defective, but nothing efficient can be done to improve them until a suitable water supply is provided for the whole garrison.

Water-closets.—There are no conveniences of this kind for the sick of this large hospital.

There are instead, out-door privies, about 50 yards from the hospital, on the south side, at the end of a range of buildings used as medical stores. There is no covered communication between the privies and the hospital. There are several smaller privies within the hospital enclosure. They all communicate with sewers by means of which their contents are very imperfectly conveyed to the sea; they are all badly constructed, not supplied with water, and most offensive. These privies are washed out once a day by throwing water down them, but the smell from them nevertheless can be detected as far as the hospital, and in summer they are stated to become a very great nuisance.

They should be reconstructed as water latrines on Macfarlane's or Jennings' principle, and supplied with water constantly, so as to have water always standing in the troughs, and they should be flushed out by opening the valves as frequently in the day as may be required to keep them in a wholesome state. Sick or ailing men cannot frequent such places as these are, without great risk to health.

Proper water-closets should also be provided for the wards in the manner hereafter stated.

The urinals, of which there are two, are as bad as the privies. They require reconstruction, and to have water laid on for cleansing them.

Ablution and Bath Accommodation.—There is no ablution or bath room connected with any of the wards. Behind the hospital, in the narrow space between its back wall and the scarped rock, there is a building containing benches, basins, and four baths, so small (only three feet long) that they are of no use.

This wash-house is placed where it ought not to have been built at all. It affords no better accommodation than is given to healthy soldiers in barracks, and it obstructs the ventilation of the narrow court, makes it more damp than it would otherwise be, and does injury to the lower wards on that side. It should be cleared away, as also the walls crossing the space, in order to leave as free a passage for air as possible, where it is so much wanted. There should be nothing to obstruct the air currents behind the hospital.

It will be necessary to provide each floor of the hospital with proper bath and ablution rooms communicating with the wards.

Cook-houses.—There are six cook-houses, one intended for the service of each regiment. They are fitted up with the usual grates, boilers, &c. The whole of them should be abolished, and one kitchen provided for the hospital. The difficulty has been to find a suitable place for it. Those in use are under sick wards, which is a most undesirable arrangement in so hot a climate as that of Gibraltar. It has been proposed to build a new kitchen on the high ground immediately behind the hospital. To this proposal we cannot assent, as besides the cost of its construction it would still further diminish the external ventilation at the back of the building; and we think the arrangement we shall propose will be suitable.

Hospital Improvements Required.

We next proceed to consider the nature of the alterations required to convert the building into a general hospital under section VIII. of the new Medical Regulations.

Internal Re-arrangement of Buildings.—The present regimental arrangement has been the subject of constant complaint for some time past on the part of the Governor of Gibraltar, the principal medical officer, and the purveyor. Besides its other disadvantages it has led to a most unnecessary multiplication of offices, stores, &c., occupying space where it is most urgently required for sick and their immediate attendants. Medical officers and their families have been quartered within the building, and their servants, horses, &c. are lodged within the hospital enclosure, increasing the number of unnecessary inmates and adding to the difficulty of preserving discipline and cleanliness.

The stores within the hospital are so many sources of foul stagnant air, which ought not to exist in the immediate vicinity of sick wards, and the whole construction has been rendered needlessly complicated by the alterations necessary for introducing the regimental system.

The only way to deal with this great evil is to clear out of the building everything not required for the immediate care and treatment of the sick. All kitchens, stores, surgeries, should be removed, and all the present partitions which the introduction of these offices rendered necessary should be taken down so as to simplify the whole building and restore it to the state in which it originally was. The medical officers' quarters should be vacated, and resumed for the special service of the hospital, and suitable quarters provided for them within a convenient distance of the building.

Cubic Space per Bed.—Having freed the building from obstructions, a sufficient amount of space should be taken for the number of beds required for the garrison, at the usual rate of strength, and also the requisite number of beds for sailors of the Royal Navy, and for each of these beds at least 1,200 cubic feet should be set apart. Gibraltar has a climate intermediate between a temperate and a tropical one, and would strictly require a larger allowance of space than the amount stated; but the size of the hospital would not admit of the tropical allowance of 1,500 cubic feet being given. In no case, however, should less than 1,200 cubic feet be set apart for each bed.

Ventilation.—The best method of increasing the light and ventilation of the wards would be to enlarge the windows by extending them upwards to within a foot of the ceiling and downwards to within 2 feet 6 inches of the floor, but as this would be very expensive, we would recommend that all the first-floor wards not yet provided with roof ventilation should have louvres carried through the ridge, and that every first-floor ward should also have louvred ventilators introduced at the eaves, on each of the opposite sides of the wards, one in each wall space between the windows and between the end windows and corners. Louvres should also be carried through the ridge of each pavilion, and a louvred ventilator placed on each side of each ward in the pavilions. By these means a free current of air will be kept up in them.

The ground-floor wards require to be differently dealt with, and for these we would propose to carry two ventilating shafts, similar to those on Plan X. Fig. 2, one at each end of these wards, up through the roof of the hospital. These shafts should have an aggregate section of one square inch for every 30 cubic feet of contents in the ward, with means of closing by valves to two-thirds of their area in cold weather. The best place for them would be in the corners. Ventilating grates should be introduced where there are fire-places. Inlets would also be required close to the ceiling, and for this purpose louvred ventilators, on each side of the ward, arranged as we have proposed for the upper-floor wards, would suffice. They should be placed at equal distances from the corners and from each other so far as the structure of the wards will admit.

The next point requiring attention is to provide sufficient accommodation in the way of dispensary, stores, and kitchen, nurses' rooms, sculleries, water-closets, baths, and ablution rooms.

Consolidated Dispensary and Stores.—We would propose to have only one dispensary, one common pack store having a superficial area of about 800 square feet, one bedding store with an area of 600 superficial feet, one utensil store, one clean linen store with 350 superficial feet, a foul linen store away from the sick wards, and a condemned store having 400 square feet of surface. The stores should be placed in the outbuildings, and additional space for them found by raising the one-story buildings at the south end of the hospital enclosure, if necessary.

The purveyors' issuing stores should be placed near the proposed kitchen wherever convenient space could be found for them.

Nurses' Rooms and Sculleries.—For all the wards in the front of the building, nurses' rooms and sculleries can be found immediately outside the ward doors, in rooms used as stores, surgeries, &c. For the wards at the back of the hospital, nurses' rooms and sculleries can be arranged in the corner pavilions. The scullery should have a small glazed earthenware sink for washing teacups, &c., together with the means of keeping these vessels. The sink should be well trapped, and supplied with hot and cold water. The scullery should be well ventilated by a shaft through the roof and by an inlet direct from the outer air.

Water-closets and Ablution and Bath Rooms.—At each end of the main building and on each floor there should be placed in a detached well-ventilated addition three water closets on Jennings' principle and a water-closet sink. In another division of the same added building there should be three white earthenware ablution basins, let into plain slate slabs and a fire-clay bath. *See* Plans XV. and XVI. The sink, basins, and bath should have hot and cold water laid on. For the wards at the back of the hospital similar accommodation should be provided at each end. Access should be obtained to these conveniences by a corridor open to the air in warm weather, but capable of being protected by windows in the cold season.

Consolidated Kitchen.—There is a building, formerly a kitchen, now used as a purveyor's store on the north side of the hospital, on sloping ground, close to the north-east corner. This building could easily be fitted up as a hospital cook-house, and connected by a wooden gangway a few yards in length, with the first floor of the hospital, and thence by a little care in preserving the heat of the vessels, the diets could be distributed all over the building. The kitchen would require refitting with cooking apparatus: hot plate, two ovens, and four boilers. Probably a Radley's cooking apparatus, similar to the one in the Royal Military Infirmary, Dublin, or one of Benham's ranges specially constructed for the purpose would do. The building is in two floors, which should be thrown into one for greater ventilation and coolness. This plan would entail the smallest outlay of money, and the displaced store could easily be accommodated elsewhere.

Organization of the Hospital.—Having described the chief improvements required, we proceed to consider the question of reorganizing the hospital, and the buildings and quarters required for this purpose.

And first, we entirely concur in the opinions expressed by all parties as to the necessity of putting an end to the present system of regimental administration. It is inefficient, costly, and injurious to the sanitary condition of the hospital. We would, therefore, consolidate all the stores and offices, and remove all persons not immediately necessary for general hospital administration out of the hospital precincts. This being done, we propose to provide for administering the hospital as a general hospital, in terms of the 8th section of the new Medical Regulations.

We have consulted with the Director-General and Purveyor-in-Chief on the subject and as to the accommodation necessary for each class of officers to comply with the regulation, and the requirements are as follow:—

1. The Director-General states that the principal medical officer at Gibraltar is too much occupied with his duties to undertake the management of a general hospital, and that it is necessary to appoint a commandant, with an office and quarters within the hospital precincts, together with a quarter for his clerk.

2. The principal medical officer has a house in town but he will require an office, together with a quarter and office for his clerk, and a quarter and office for the registrar.

3. Orderly medical officer with quarter within the hospital precincts.
4. Dispenser with quarter within the hospital precincts.
5. Purveyor, and a clerk, with quarters, and office.
6. Paymaster and clerk with quarters and office.

The quarters of purveyor and paymaster may be outside the hospital precincts.

7. Captain of orderlies with quarter and office within the hospital precincts.
8. Quarters for non-commissioned officers and men of the army hospital corps.

The following quarters will be required for the medical branch of the army hospital corps:—

1 Serjeant-major, 8 serjeants, and 30 orderlies (privates).

The orderlies' rooms to be attached to the wards would each count as one quarter.

For the purveying branch of the corps quarters will be required for—

1 Serjeant-major, 2 serjeants, 1 lance serjeant, and 5 privates.

Quarters will be required for surgeons who cannot be conveniently quartered with their regiments, each quarter consisting of two rooms and kitchen with accommodation for their servants in common, and also stable accommodation, all outside the hospital precincts.

The orderlies should have a light, airy, well-ventilated sleeping room, with opposite windows, the beds between the windows, shafts for the removal of foul air and inlets for admitting fresh air. There should be an allowance of 600 cubic feet each man at the least. They also require a room for dining, which might be placed near the kitchen.

Each ward master or assistant ward master must be quartered so as to have entire command of the division of the hospital of which he has charge. Probably one ward master's or assistant ward master's quarter would be required for each floor of each side of the hospital square on which there are sick. He might occupy one of the rooms attached to a ward.

There should be a waiting room together with a reception room for patients, the latter supplied with a bath for cleansing the men before admission to the wards. These could conveniently be placed in a one-story building near the lodge.

It would be of great importance in such a place as Gibraltar to appoint female nurses as soon as the experience at Woolwich has been sufficient to warrant this step; and if this were done, quarters could be found for the nurses in the existing buildings.

These proposed arrangements must of course be subject to careful local investigation, and possibly some of them would have to be modified; but it appears to us to be unadvisable to erect more additional buildings than can possibly be avoided, partly on account of the hospital itself and partly from the nature of the tenure on which it is held from the Admiralty.

There is no accommodation for the sick wives and children of married non-commissioned officers and soldiers; and nothing satisfactory can be done in the way of providing this accommodation until the question of married quarters is settled. At present the married people live all over the garrison from the Neutral Ground to Europa point, and one hospital establishment would not be sufficient for them. When quarters are provided probably two or three rooms at the most convenient points for access from or attached to the quarters of each district for lying-in women and sick children would best meet the case.

A reference to the annexed plans of the hospital, Nos. XXV. and XXVI., showing its present state and the proposed changes, will enable a clearer idea to be formed of the nature of the alterations we have recommended.

1. We propose that all the temporary cross partitions dividing the wards on the ground floor, at present occupied as stores, kitchens, &c., be removed, to throw the wards open from end to end, so that they shall correspond to the wards over them. All temporary partitions in the upper floor wards to be likewise removed. The whole of the space so reclaimed to be rendered fit for the reception of sick, and the ground floors to be boarded, with ventilation beneath them.

We propose to provide the administrative offices as follows (the references are to be altered plan, No. XXVI.):—

2. The pavilion F, F, at the entrance gate of the enclosure, to be set apart for the commandant's quarter.

3. The ground floor I, I, of the south-west pavilion to be for the orderly medical officers' quarters.

4. The two upper floors *i*, *i*, of the same pavilion to be for the captain of orderlies' quarters.

5. The north-west pavilion G, H, *h*, *h*, *q*, *q*, we intend for a quarter for the superintendent of nurses, for the clean linen store, mending room, and nurses' quarters. Waterclosets will have to be provided for all these quarters.

6. The purveyor's quarter to be at *m*, *m*, and the purveyor's stores removed out of the hospital, to be placed in an additional story added to the existing stores *a*, *a*. The issuing stores to be at K, on the site of one of the kitchens.

7. A new dispensary with dispenser's quarters will have to be built at X, Y, *o*, *o*.

8. A new block of one-story buildings will also require to be built at the west side of the entrance gate (Q, R, S, T, U, V,) for waiting room, surgery, registry, and principal medical officer's office. The offices for the commandant, purveyor, and captain of orderlies are at N and O, under the purveyor's quarter.

9. We propose to remove the stables out of the buildings they occupy at present, and to convert them into a fuel store Z, and a foul linen store *f*.

10. The kitchens removed from within the hospital we propose to consolidate in one kitchen at L, and to make the building there suitable for this purpose by throwing the two floors of the building together to obtain more height and ventilation.

11. From this kitchen the diets will be carried by a gangway at *s* to the first floor of the hospital.

12. The ward nurses' rooms and sculleries we propose to obtain as follows:—The rooms A, A, on each side the central entrance and staircase to be used for wardmasters or nurses. The rooms A, A, on each floor of the back pavilions to be set apart for the same purpose. The rooms B, B, attached to these nurses' rooms to be for sculleries.

13. The orderlies to be accommodated in the upper floors *p*, *p*, of the pavilions at the back of the hospital. The orderlies' dining room to be at *k*, over the purveyor's issuing store.

14. Waterclosets, baths, and ablution rooms may be most conveniently placed as follows:—

Behind the front line of buildings at each end there is a small court containing some useless constructions. We propose to remove these and to throw the courts open for ventilation. In doing this sufficient space can be obtained for waterclosets and baths, and as they will be reached from the wards by outside verandahs, they will be completely cut off from the wards. For the back line of wards, waterclosets and baths will have to be constructed at one end in a small court, and at the other end in a small building projecting beyond the line of the hospital. The positions in which we propose to place these are shown at E, E, E, E, on the altered plan.

With these re-arrangements and trifling additions this hospital will be greatly improved, both in its sanitary condition and in its facilities for administration and discipline.

REFERENCES to the PLANS of the NAVAL HOSPITAL, GIBRALTAR.

Plan No. XXV., Present Accommodation.

A. Officers' quarters.
B. Serjeants' quarters.
C. Surgeries.
D. Purveyor's stores.
E. Cook-houses.
F. Servants' rooms.
G. Purveyor's quarters.
H. Officers' kitchens.
I. Prisoners' ward.
J. Pack stores.
K. Stores.
L. Stables.
M. Apothecary's store.
N. Dead house.
O. Guard house.
P. Ablution house.
Q. Bath room.
R. Lodge.
S. Men's latrines.
T. Sergeants' do.
U. Waiting room.
V. Women's waterclosets.
W. Naval officers' quarters.
X. Purveyor's office.
Y. Orderlies.
Z. Dispensary.

Plan No. XXVI., Proposed Accommodation.

A. Nurses' rooms.
B. Sculleries.
C. Serjeants' quarters.
D. Serjeant-majors' do.
E. Baths, waterclosets, and lavatories.
F. Commandant's quarter and kitchen.
G. Mending room.
H. Clean linen store.
I. Orderly medical officer and servant.
J. Women's waterclosets.
K. Purveyor's store (issuing).
L. Cook-house.
M. Purveyor's kitchen.
N. Purveyor's office.
O. Commandant's and captain of orderlies' office.
P. Lodge.
Q. Waiting room.
R. Surgery.
S. Bath room.
T. Clerk to principal medical officer.
U. Principal medical officer.
V. Registry.
W. Guard house.
X. Dispensary.
Y. Dispenser's kitchen.
Z. Fuel store.
a. Purveyor's stores.
b. Apothecary's stores.
c. Men's latrines.
d. Orderlies' latrines.
e. Serjeants' do.
f. Foul linen store.
g. Servant.
h. Superintendent of nurses and kitchen.
i. Captain of orderlies.
k. Orderlies' dining room.
l. Purveyor's servant.
m. Purveyor's quarters.
n. Purveyor's watercloset.
o. Dispenser's quarters.
p. Orderlies.
q. Nurses.
r. Ward for naval sick officers.

The numbers refer to the wards.

PART III.—BARRACKS AND HOSPITALS IN MALTA AND GOZO.

We propose in this part of the report to give, first, a general account of the topography, climate, and diseases of Malta, together with a statement of the diseases incident to troops serving on the station.

We shall then give a general description of the present barrack and hospital accommodation, its sanitary condition, and the nature of the improvements we propose should be carried out; and lastly we shall give the details regarding each barrack and hospital separately.

SECTION I.—SANITARY CONDITION OF THE ISLANDS.

The Malta command consists of a group of small islands, extending from N.W. to S.E., in a line about 27 miles in length. They are situated about 70 miles from the most southern point of Sicily, and about 200 miles from the nearest point of the African continent. Their approximate latitude is 35° 53′ 49″ N., and their longitude 14° 30′ 28″ E. The most northern of the group is the island of Gozo, which is separated from Malta by a channel three miles in breadth, with the small island of Comino lying about midway in the channel. There is accommodation for troops on both the larger islands; and we shall consider their general topographical features, climates, and diseases together.

1.—Topography of Malta.

This island is 17 miles in length, by 8 miles in its greatest breadth. It is of an irregular oval form, deeply indented with bays along its northern aspect. The land generally rises by a rapid slope from the sea, and along a considerable part of the coast it is rocky and precipitous.

The interior of the island is undulating and hilly. The highest ground is on the south side of the island, and consists of a range of rocky heights, with ravines descending from them.

There are several parallel chains of hills running from W.N.W. to W.S.W., right across the island. They are generally from 500 to 600 feet in height, but the Bingemma hills, 9 miles west from Valetta, attain a height, at their highest point, of 829 feet above the level of the sea.

There is more or less of table-land on the summits of the highest ridges, and the descent to the valleys is often very steep.

The approximate superficial area of the island may be stated at 100 square miles, divided into several natural drainage areas by the configuration of the ground. The N.W. extremity of the island is drained to the sea by a number of ravines. The S.E. extremity is drained by valleys. The whole of the central part of the island, amounting to about half of its entire area, has its natural outlet for drainage towards the harbours of Valetta. Most of this area drains into a valley, in which the village of Curmi is situated, above the head of the Great harbour. This valley is the lowest ground in the island; part of it indeed was formerly a marsh, gained from the sea, and is about to be restored to it in the shape of a great commercial port, which, when completed, will be one of the most important public works in the island.

While the marshy ground existed the vicinity of it was dangerous to health, so much so that the village or Casal Paola, situated on the slope of a hill half a mile to the S.W. of it, became uninhabitable from fevers, and was deserted by the people.

There is neither lake nor river in the island; but during the season of the rains some of the dry ravines become converted into deep and rapid streams for a short time. Most of the rain-fall however is absorbed by the very porous subsoil.

The geological structure of the island, as determined by the survey of the Earl of Ducie and Capt. A. B. Spratt, R.N. appears to belong to the tertiary series. The lowest rock is a hard semi-crystalline limestone, occurring at various points along the coast, and also in the interior of the island, particularly along a great fault which traverses the island from east to west. Above this is a series of soft porous sandstones of different shades of colour, yellow, reddish and white, which furnish the Maltese building and filtering stones. They are easily worked, not persistent in the air, and they absorb a large quantity of water during rain. All the permanent barrack and hospital accommodation in the island is constructed of these sandstones. They form the surface of three-fourths of the area of the island, covering the middle and eastern districts.

There is no other formation above them until we arrive at the hilly western end of the island, where we find the sandstones underlying beds of marl and coloured sands, over which, and covering all the higher ground, are beds of coral limestone. The great fault, already mentioned, has been occasioned by a change of level of the eastern extremity of the island for many yards, by which the coral limestone, the highest member of the series, has been made almost conformable with the crystalline limestone, which is the lowest. The only deposit of alluvium in the island is found in the valleys, principally in those at the western end. Everywhere else, with the exception of a patch here and there, or where the people have carried alluvium to cover the surface, there is nothing but bare, barren rock, of a pale yellowish colour. From the absence of water and soil there are very few trees, and such as exist are chiefly confined to private fields and gardens. There are no hedges, only uncemented stone walls; and no shade from the hot scorching sun, and the bright light reflected from the ground and walls. The general aspect of the island is barren; but the people are very industrious; and by hard labour in breaking up the surface, carrying soil from places where it can be obtained, sea-weed and other matters for manure, and by watering the plants, the island is more productive and richer in agricultural produce than its barren aspect would indicate.

The great improvement required everywhere, but particularly in the vicinity of the barracks, is shade from trees. This can only be obtained at considerable labour and cost, for the reasons mentioned; a good beginning has, however, been made in the botanic garden at Floriana, and also by the present Governor, Sir J. Gaspard le Marchant, who has very successfully planted several squares in Valetta with beautiful trees, among which are fine specimens of the *Wellingtonia gigantea*, perhaps the largest in this hemisphere.

There is nothing in the general features of the island to render the atmosphere unhealthy, or to give rise to particular diseases, although from the soft porous nature of the building stone it is liable to retain damp, both in the foundations of houses and in walls and roofs constructed of it. The chief causes of disease must, therefore, be sought for either in special localities or in sanitary defects, unwholesome habits, &c.

The population is chiefly aggregated in the series of towns of which Valetta is the centre. The remainder is in large villages scattered over the country. With the exception of one or two small forts, and the new barrack at San Giorgio, the garrison of the island is quartered in immediate proximity to the towns of Valetta, Vittoriosa, Senglea, and Cospicua, which are all within the lines, Plan XXVII.

Valetta, and its suburb Floriana are situated on the north-east side of the island, and occupy part of a long tongue or peninsula of rock nearly two miles in length by half a mile in breadth, lying from S.W. to N.E. between the two principal harbours of Malta. The Great harbour bounds the peninsula along its whole length on the S.E., and Marsa Muscetto, or the Quarantine harbour, bounds it on the N.W. The extreme point of the peninsula on which Fort St. Elmo is situated projects into the open sea between the mouths of the two harbours. It is about 50 feet above the water level, and from Fort St. Elmo the ground continues to rise until it attains a height of about 170 feet at the bastions on the land side of the town. As seen from the harbours Valetta rises boldly out of the water, and is well exposed to the sea breezes.

In the same manner as Valetta projects between the two harbours, there are long narrow tongues of rock projecting into each of the harbours, leaving creeks between them. There are five of these projecting tongues in the Great harbour. On the outer one, next the open sea, Fort Ricasoli is situated. The next is occupied by the great naval hospital. The third is covered by Citta Vittoriosa, with the town of Cospicua on the land side of it, and Fort St. Angelo at its point, opposite the entrance to the Great harbour, at about a third of its length from the sea. The fourth peninsula is long and narrow, and is covered by the town of Senglea. These towns are all strongly fortified, and lie within the Cotonera lines. The dockyard creek lies between Senglea and Vittoriosa. Near the top of the harbour, beyond Senglea, are the Corradino heights, which project between French creek and the upper end of the harbour; they are not built on. These projecting points of land are all of sandstone rock, and rise boldly out of the water, but to a less elevation than Valetta.

There are four projecting points of land in the Quarantine harbour. The outermost of these next the sea is occupied by Fort Tignè. The next is an island connected with the land by a short bridge. Fort Manoel and the Quarantine establishment are built on it.

Near the head of the harbour are two other tongues of land, Misida or Tascibiesc and Pieta, not used for military purposes. All of these projections are also of sandstone, and rise to some height out of the water, but all are overlooked by Valetta.

The foreshores towards the sea are of rock. They are the same in the harbours, with the exception of the marshy ground at the upper end of the Great harbour, now being excavated for a commercial dock. The upper ends of one or two of the creeks are liable to deposit of decaying matter floated into them. There is also some low ground on the west side of the Quarantine harbour, not very well drained, but it is at a considerable distance from the town.

The Mediterranean being a tideless sea, the water in all the harbours is more or less stagnant, and this is the cause of very serious nuisance, not so much from the fact of stagnation itself, as from its effects on the sewage of the town, and on other putrescent refuse discharged into both harbours. From the want of rapid circulation of water, considerable areas of the surface become charged with offensive matters, the smell from which extends into the towns and even into certain of the barracks.

The same defect exists in all the Mediterranean ports, and in Malta, perhaps, less than in others, on account of the larger body of water in the harbours. We shall revert to this subject further on.

2.—Topography of Gozo.

Not much requires to be said as regards Gozo. Its general features resemble those of the western extremity of Malta, except that there are a larger number of isolated hills, apparently the result of extensive denudation. The lowest rock is semi-crystalline limestone, over which are sandstones, marls, and coral limestone, as in the Malta series. The small island of Comino appears to consist entirely of coral limestone. The marls cover a much larger surface in Gozo, and the island generally has a much greater appearance of fertility than Malta. There are also more trees on it, and deeper soil.

The castle of Rabato, which contains some accommodation for artillery, is situated on one of the lofty isolated hills alluded to, in the centre of the island.

Fort Chambray, which contains most of the barrack accommodation, is on a bold headland on the S.E. of the island, opposite Malta.

There are no sources of local unhealthiness in the position either of Rabato or Chambray; both are on lofty eminences, and Chambray is exposed to the sea breeze.

All the permanent barracks in Malta are built on the porous sandstone rock, and those in Gozo are on the coral limestone.

From the very soft character of the sandstone its surface is so easily ground to powder that the least breath of wind during the dry season fills the air with dust, which, together with the dry hot state of the atmosphere and the glare from reflected sunlight, is considered to be a cause of ophthalmia among the troops.

3.—Climate.

For a number of years past there has been a meteorological observatory in Valetta, at which observations have been kept by officers of the Royal Engineers. In the Appendix (Nos. 1 and 2) we have given an abstract of these for two years, 1859 and 1860, which are sufficient to give a general idea of the climatic peculiarities. Taken as a whole, the climate is not one of extremes. The mean variation of temperature between morning and afternoon is hardly more than a degree or two. Between day and night the average highest and lowest temperature varies from 8 to 10 degrees in winter, and from 10 to 15 degrees in summer. The mean maximum temperature of the hottest months varies from 73° to about 88°; and the mean minimum of the hottest months varies from about 60° to 73°. The mean maximum of the coldest months varies from about 58° to 64°, and the mean minimum from about 49° to 54°. The highest temperature of the hottest months has varied from 87° to 101°; and the lowest of the colder months from about 39° to 47°. The highest observed temperature in the shade has been 101° in summer, and in winter 75°. The sun temperature has been observed as high as 120°. The lowest observed temperature on any day in summer has been 53°, and in winter 39°. The extreme monthly range of temperature in the most variable months has been 32° in summer and 28° in winter. The mean humidity of the air varies from about $\frac{7}{10}$ths to $\frac{8}{10}$ths of the quantity required for saturation.

The late autumn, winter, and early spring are the periods of rain. The rains usually begin in October, in which month about 1½ to 2 inches fall—most of it in a day or two. In November the amount varies in different years from less than 2 to 6, 9, or 10 inches, from a third to a half of which has been observed to fall in one day. The fall in December diminishes, and in January or February together the fall is about 2½ to 9 inches. In both months the greater part of the rain falls in two or three days. The total rain-fall varies considerably in different years.

Winds blow from the NW., N., and NE. for about three-fifths of the year; S. and SE. winds prevail for about a fifth; and the remaining fifth is made up of SW., W., and E. winds, chiefly the first.

The climate is simply the result of insular position and temperature. Like all places in the Mediterranean, Malta is exposed to the sirocco winds, which, whenever they prevail, lower the standard of health for the time. They blow from 60 to 80 days a year, and produce languor, lassitude, and disinclination for exertion. The sick and persons in feeble health suffer from them, especially in situations directly exposed to their influence. The sun's rays are very powerful during summer, partly on account of the transparency of the atmosphere, and everything is scorched and dried up by them.

As a whole, Malta enjoys a fine climate, especially in winter and spring, during which seasons the heat is temperate and the climate very healthy. A rise in temperature is attended by a lower standard of health; and when the mean air temperature reaches 70° F., which it does early in June, sickness begins to increase gradually. July, August, and September are the most unhealthy months. The mean air temperature falls below 70° F. early in October, the increase of sickness disappears, and the remainder of the year is healthy.

Small as the island is, it has local climates differing materially from each other. The observations kept by the Royal Engineers give the climate at Valetta; but the observations do not represent the climate on the hills at the western extremity of the island. There are, it is true, no observations to show in what the difference consists, but there is no doubt that at Città Vecchia, and indeed along the ridge extending to the south from it at elevations of 600 to 750 feet, the temperature is lower and the air keener and more bracing than it is lower down. So much is this the case, that during summer the feeling in going from Valetta to the hills is like that produced by going into a colder climate, and the atmosphere is on this account found not to be suitable for chest diseases. There are excellent local sea-shore climates, such as that at Sliema, to the NW. of Valetta, which afford a ready relief during summer from the hot close streets of Valetta.

It will be seen that there is nothing in the general topography or climate of Malta directly productive of disease. Like every other climate this has its inconveniences; and, like other climates of high average temperature, it exercises a certain debilitating influence on the natives of colder latitudes; but, besides this its nature is such as to add intensity to the effects of local causes of disease and to the consequences of intemperate habits, and all local causes and personal habits are of much greater importance in warm than in cold climates, especially as regards their influence on the frequency and intensity of epidemics.

4.—Mortality and Diseases of Native Population.

We next proceed to state what are the prevailing diseases among the native population, and to compare them with those which prevail among the troops in garrison.

With this view we have obtained the police mortality returns among the native population for three years for all the town and country districts, and also the admissions and deaths for three years in the civil hospital, at Floriana, abstracts of which are given in the Appendix (Tables, 3, 4, 5, 6).

We have retained the diverse nomenclatures and classifications of the returns, in order to show the necessity for assimilating both to those recommended by the International Statistical Congress, and used by the Registrar-General of England. We were informed by the Hon. Mr. Inglott, comptroller of charitable institutions, that he considered it indispensable that this should be done, and that he was endeavouring to introduce the reform into the institutions under his control. The police statistics must also be brought under the same system before reliable data can be obtained to show the state of the public health. And one form of return should be made use of. As a proof of the necessity of the change proposed it will be observed that the hospital forms recognize "diarrhœa" and "dysentery" as having occasioned 84 deaths in three years in hospital; while the police returns take no notice whatever of these diseases. They are apparently included under the names "gastritis" and "enteritis" by the police registration; and as a consequence the returns are useless for ascertaining the sanitary state of the population at any given time.

The only means at our disposal for comparing the mortality with the population is derived from the census of 1851, and as the population has increased since that period, the death rate given by the police returns, ought to be less than it is, but even supposing that no increase of population has taken place, the death rate is very low for the towns and very high for the country districts exhibiting in both cases an anomaly which we have no means of accounting for excepting on the supposition that the system of registration is not such as to afford reliable results.

For example, the census of 1851 gave for the whole island a *native* population of 98,021. Of these 52,169 were located in the five towns within the garrison, and 45,852 occupied country districts, mostly in large villages.* Taken on this population, the police returns for the years 1859–60–61, would give an average death rate, for the towns, of 21·3 per 1,000 per annum, and for the country of 28·7 per 1,000, a difference so very striking as to demand further inquiry to say the least of it. Another singular circumstance is that nearly 57½ per cent. of the mortality is returned among children under five years of age, a rate far exceeding that of the most unhealthy large towns in England.

The mortality of the towns within the garrison from these, the only available data, is as follows:—

Towns.	Population, 1851.	Mortality per 1,000 per Annum (1859–60–61).
Valetta - - - -	23,627	21·6
Floriana - - - -	6,504	15·8
Senglea - - - -	5,952	20·6
Cospicua - - - -	10,576	24·1
Vittoriosa - - - -	5,510	22·3

The anomaly in this case is that while the towns in their unimproved state show a comparatively low mortality, the proportionate difference between them individually is far more in accordance with their respective sanitary condition, than is the difference between their collective death rate and that of the country districts, when compared with the respective advantages of town and country as regards health.

An examination of the causes of mortality presents some rather unexpected results. Periodic fevers are extremely common along the shores of the Mediterranean, and yet during these three years the police returns contain not one death from either remittent or intermittent fevers. Indeed the printed form in use has no headings for periodic fevers. The hospital form, on the other hand, has a heading for intermittent fever, but none for remittent, and a reference to it will show that in the same three years there were 25 cases, and 2 deaths from intermittent fever among natives admitted to the civil hospital. It is worthy of remark that the police returns take no notice of these 2 deaths. The following abstract shows the chief groups of diseases to which the mortality in the police returns is attributed:—

Diseases.	Total Mortality, 1859–60–61.	
	Town.	Country.
Fevers, nervous, typhus - - -	132	91
Small-pox - - - - -	196	130
Whooping Cough - - - -	45	69
Croup - - - - -	47	35
Measles - - - - -	47	61
Teething - - - - -	741	820
Convulsions - - - - -	153	327
Scrofula - - - - -	13	18
Phthisis - - - - -	156	71
Atrophia Mesenterica - - -	170	297
Total - - -	1,700	1,919
Mortality from all other diseases - -	1,644	1,906

Here we have certain groups of diseases which are known to be connected with foul air in dwelling houses, arising from filth, bad drainage, overcrowding, bad ventilation, and general defective management of children, occasioning one half of the entire mortality of the island. If to these we were to add the annual deaths from dysentery and diarrhœa, neither of which diseases, although common enough, figure in the police returns (unless they are placed under "gastritis," and "enteritis"), and an indefinite disease which causes a large amount of mortality under the name of "debility," we should have a very large death rate from mitigable and preventible disease.

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* Table No. 5 (Appendix) gives an abstract of the *total* population of Malta and Gozo from the Census of 1851.

The hospital statistics show that during the three years under consideration, there were 195 natives admitted for diarrhœa and dysentery, of whom 68 died.

The hospital table gives the nature of the fevers admitted according to the nomenclature in use. The most common forms are continued, intermittent, and typhoid, the first occasioning the largest amount of mortality. The most frequent of the fatal forms of fever in the police returns are all included under the generic name "nervous fever" and "typhus." Distinctly marked remittent fever appears to be of unfrequent occurrence.

There is another disease called "anthrax," "carbuncle," "phlegmon," "boil," "pustule," not uncommon at Malta, as in other Mediterranean cities, which is of great importance on account of its supposed relation to plague.

Dr. Burrell, in his report on the plague of 1813,* has shown that in 23 years preceding 1843 nearly a tenth part of the admissions into the civil hospital at Floriana were of this disease. The deaths were about one in 60 of the cases.

In 1846 there were 22 deaths from boil, and 121 deaths from fever, and since then anthrax has afforded a mortality of from four to eight or ten a year. In the years 1850, 1851, and 1852, 684 cases of anthrax were treated in the dispensaries of Malta and Gozo, of which 15 died; a mortality of one in 45 cases. The disease usually shows itself in the form of tumours at the lower part of the neck, between the shoulders, or in the loins. They are said to vary in size from that of a pigeon's egg to a circumference of eight inches. They are preceded by shivering, head-ache, prostration, sickness, occasional vomiting and sleeplessness, succeeded by fever, the appearance of the carbuncle, and slight typhoid symptoms. A large proportion of the cases are very trifling in character, but in particular years the disease is more severe; it yields a higher mortality, and the cases are of protracted duration.

In the years 1859–60–61 there were 142 cases of this affection admitted into the civil hospital, Floriana, of which 10 proved fatal. The police returns for the same years give 38 deaths for the whole island from this disease, and also 223 deaths from nervous or typhus fever.

Anthrax and its allied diseases are more common in summer than in winter, and among males than females. Its subjects are generally persons of sickly appearance, but of gross habit, living in damp, filthy localities, where the plague formerly committed its ravages.

Malta has suffered considerably from two other epidemic diseases, cholera and small-pox. The former disease first appeared in the island in 1837, and cut off 3,783 of the civil population. This large mortality shows a high degree of susceptibility to epidemic disease.

Small-pox also prevails to a considerable extent occasionally, although compulsory vaccination has been in use for seven years, as shown by the Ordnance, Appendix Nos. 9 and 10. This disease existed in its epidemic form while we were in Malta, and had cut off 150 children in 7½ months, as shown in Appendix 11. It occurred chiefly in the usual epidemic localities, abounding in local causes of disease. Sanitary improvement and a more extended use of vaccination, are absolutely necessary to diminish the frequency of this scourge. Rheumatism is also a common disease, affording about 120 annual admissions to the civil hospital.

The most important feature in the sanitary history of Malta is the occurrence of plague epidemics, of which five are on record, those of 1592–3, 1623, 1655, 1675–6, and 1813. During the first visitation 3,800 persons died. There were only 20 deaths in 1655. The most severe visitation was that of 1675–6 during which 8,596 persons died, out of a population of 60,000. In 1813, out of a population of 92,000, 4,440 died of the pestilence.

This last epidemic was preceded by plague at Constantinople, Smyrna, and Cyprus, in the year 1812. In this year also yellow fever broke out in Spain. In January 1813 plague occurred at Alexandria. In June and July of the same year, while plague existed at Malta, there was yellow fever at Gibraltar; the facts all proving that an epidemic influence prevailed over a large area of the earth's surface.

The Malta epidemic of 1813 might have been the best observed on record, but unfortunately so much time and attention were bestowed on discussions about contagion and quarantine, that many of the most essential points in its history were lost; and it was only by inquiries carried out by Dr. Burrell nearly forty years afterwards that anything like a sanitary account of the epidemic was rescued from oblivion. Like all epidemics it began slowly and without attracting notice. Detached cases of doubtful character occurred at the end of March and beginning of April. The first recognized case occurred on the 14th April and died on the 19th. On the 5th May there were no known cases of the disease, and it was not till the 19th May that the epidemic showed itself. After that date it followed the usual epidemic law of increase and decline, and finally disappeared in the spring of 1814.

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* Appendix V. to the Second Report on Quarantine of the General Board of Health, 1854.

By the time the presence of the disease was fully recognized there was little hope of benefit from any measures of hygiène. But everything that could be done to aggravate the pestilence by the most absurd and destructive internal quarantine was certainly accomplished, with the result, as shown by Dr. Burrell's inquiry, that while, on the one hand, in six places containing 44,247 inhabitants, subject to the most refined system of restriction ingenuity could devise, 4,221 persons perished; on the other hand, among a population of 47,654 persons living in 16 infected places, where quarantine was lax or non-existent, there were only 219 deaths.

It is not likely that anything so absurd should be again countenanced as forbidding people under pain of death to leave their dark foul cellar dwellings during a pestilence, in order to obtain a breath of fresh air in the country; or that an entire population should be walled in with double walls and cordons of troops, while the only chance of safety consisted in their escaping from their houses into the fields: but the experience is too important to pass without notice, and it ought to be held up as a warning for the future.

We shall presently show how the pestilence, or at least the causes which determined its outbreak, were unconsciously allowed to grow up in the midst of the population, while the source of it was sought anywhere and everywhere except where it was to be found. The evidence, so much dwelt on at the time, for the importation of the pestilence, and for its propagation by contact, is not worth a moment's notice. But we have in the towns where it committed its ravages abundant indications, notwithstanding their comparatively improved condition, of the reason why plague appeared in them, and why the cognate diseases, carbuncle, boil, and fever, still prevail.

5.—Sanitary Condition of Valetta, and the other Towns within the Lines.

We next proceed to describe the sanitary condition of the towns within the garrison, beginning with Valetta.

The oldest building in Valetta is the Military General hospital, which was built in 1575 after the siege, and was the hospitium of the knights. It seems to have been the first building of any size constructed outside Fort St. Elmo. The town was subsequently extended over the crest and slopes of the peninsula it now occupies, until its further growth was stopped by the defensive works on the land side. The streets are laid out so as to cross each other at right angles, dividing the town into separate blocks, each about 100 yards in length by 50 yards in breadth. All the principal streets are open to the air, and, except in calms, there is always some circulation of air through them. There are, however, several districts of houses of a very inferior character, either surrounded by higher walls or in unhealthy localities. One of these, the Manderaggio, is built in what was once the inner harbour of Valetta, and is embedded, so to speak, among higher houses. It is the most closely and irregularly built district almost anywhere to be met with. There are no streets, only narrow tortuous alleys among lofty houses, and the place literally swarms with people. Except in this and in one or two other low districts, the general appearance of the town is fine, and contrasts favourably with other Mediterranean towns. The streets are wide and well paved, many of the houses are of very superior architecture, and the light colour of the stone gives a bright clean appearance to the town.

It is not, however, by its external appearance that the sanitary state of Valetta is to be judged. To ascertain what this really is, we must go below the surface, where we find at once certain elements of mischief connected with the local topography, drainage, and construction of the houses, which detract very much from the impression produced by external appearances.

As already stated, Valetta is built upon a peninsula of very porous rock, into which every fluid percolates almost with as much ease as into sand; and the whole subsoil, covered by houses, would in time become necessarily saturated with impurity, and a source of malaria, unless special care were taken as regards drainage. Only about a fourth part of the town occupies what may be called a flat surface, the remainder is built on very steep slopes falling from the flat part on three sides towards the sea. The tendency then of the subsoil drainage will be to gravitate towards the lower levels, on which most of the town is built; and the lowest lines of streets will be most liable to damp and malaria.

The houses along the lowest levels, including the Manderaggio, are those which are most liable to epidemic diseases among their inhabitants; and Dr. Burrell has proved by careful inquiry that they were the special seats of the plague of 1813. The pestilence appears to have burrowed among the houses on the lower levels, and to have become less and less frequent in proportion as it approached the higher levels, where the upper blocks gave one, two or three deaths, while the lower blocks gave from 10 to 20 or more deaths. In the Manderaggio, which occupies the area of two blocks, there were 85 deaths; and within a gunshot of it there are blocks of houses in which only one death occurred. But lowness of position is not the only determining cause of epidemic disease at Valetta.

Construction of Houses.—The defective construction of the houses, and their want of ventilation, have hitherto exercised an almost equal degree of influence on the public health, as their local position. In building a house the practice has been to dig a cellar foundation in the rock, over which the house is built. There is generally a water-tank under the cellar; sometimes the privies are there also. Any way there is a reservoir of foul air, of the existence of which anyone may be satisfied in going into the cellar, or even by passing the opening of it in the public street. With a porous subsoil, like that at Malta, the only safe way is to build above its natural level, and to leave a free ventilation between the ground and the lower floor of the house. Not only is this neglected, but even at the present time it is lawful to construct and use cellars as human dwellings; although this practice has been either abolished or very much restricted by law in the cooler climate of England.

The blocks into which the town is divided are of a very complex structure, often consisting of a number of small closed courts of lofty houses, entered by a small doorway from the street, to which the only admission of fresh air is from the top of the well formed by the houses. All the lower rooms are dark, and most of them are very imperfectly ventilated. Generally speaking, the best houses are in the wider streets at the higher end of the town, and the worst classes of dwellings are situated on the slopes and among the narrow streets near the harbours. But all over the town there is a mingling together of good and bad in the same block, and in the same street. Some of the very worst human dwellings anywhere to be seen are indeed situated immediately behind the principal streets in the higher part of the town. Generally the ground floor towards the principal streets is laid out in shops; and in the worst class of streets and courts the ground floor is used as a dwelling. It is usually arched, and sometimes a kind of floor is carried across the arch to form an additional sleeping-place for the family. Sometimes there is a hole in the floor communicating with the water-tank below, intended for the supply of the family. There are no means of ventilation except by the door and window on one side; there is nothing but the dead wall behind, sometimes formed by the rock, and no thorough draught. The poorer classes of houses are very dirty and dark, and the air in them is damp and foul. In summer these places are almost uninhabitable, and the people often sleep on the pavement outside.

Above the ground floors are the mezzanini, consisting of low-roofed rooms, often without thorough draught, badly lighted, and many of the rooms not much healthier than those in the ground floors below. The existence of back-to-back houses and shops renders house ventilation next to impossible. Every breath of air is of importance in these low, confined, overcrowded neighbourhoods; and instead of this there is stagnation at all ordinary times, and especially during the hot unhealthy periods of the year.

The worst district in Valetta is the Manderaggio already mentioned. Its peculiar structure renders it a separate town, so to speak, partly under the surrounding levels. It has no straight streets running through it. At every turning there is a cul-de-sac, and the air is always stagnant. The Manderaggio has its own peculiar group of population, and was formerly a very unsafe place to go into.

The houses in it are of the most miserable description, and are quite incapable of improvement. They are in a number of floors, reached by narrow stairs; the rooms small, dark, and noisome; and the whole place greatly overcrowded.

One of the greatest improvements in Valetta would be to pull the houses down, fill up the Manderaggio to the surrounding levels, and to build proper houses on its site.

In all the lower districts the people are sallow and sickly in appearance, and bear unmistakeable marks of the effects of impure air.

These miserable places furnish a large proportion of the cases of boil and fever occurring among the population. At the time we were there small-pox existed to a considerable extent among the people inhabiting them, and in fact they are the very places where epidemic disease would be expected to establish itself. Dr. Burrell has shown that during the plague of 1813 three times the number of ground floors and mezzanini were attacked by the disease as of the better class of houses above them.

With one or two exceptions the upper floors on the summit level of the town escaped the pestilence.

The cases on this level were confined to ground floors and mezzanini, there were none on the upper floors, and all the upper floors where the disease appeared were, with the exceptions stated, on the steep slopes leading down to the sea. It was a current remark at the time that plague was a disease that "seldom went up stairs;" and it certainly kept away from the higher, better drained, and better ventilated parts of the town, except where it found a suitable habitation in the damp, dark ground floors or unventilated mezzanini.

No one on seeing Valetta at the present day can judge of what its sanitary state was in 1813. Outwardly it is now one of the cleanest and best-kept towns in existence. It has a good sanitary police, and much has been done to improve its drainage. At the former period it was very filthy, neglected, and abounding with nuisances; but there is still enough in its present condition, and in that of the other towns, to account for the zymotic diseases which exist among the people, and to incite to vigorous prosecution of sanitary improvements. No doubt if the present enlightened course of Government be continued, the existing causes of disease will in time be removed.

In 1813 many of the better classes, from living under better sanitary conditions, escaped the epidemic, or had slight fevers which were easily arrested by removal into the country, while their neighbours perished by hundreds. Now, thanks to sanitary improvement, the worst-constructed parts of the town suffer not from plague, but from fevers and boils. It is to the extirpation of these classes of disease that future sanitary efforts must be directed; for it is unsafe to allow of their existence in the midst of a dense and increasing population in a fortified garrison town.

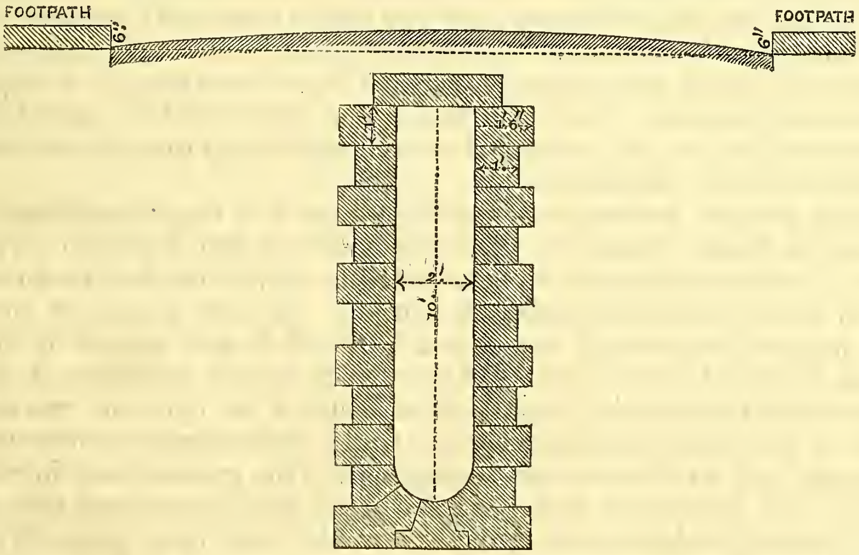
The general structure of the other towns differs from that of Valetta. Floriana is small, regularly built, and open. Vittoriosa is older and more irregular. The streets are much narrower than those of Valetta, but the area covered by the town is hardly a fourth part of the area of Valetta. Senglea is about the same size as Vittoriosa, but it is more regularly built. It consists of parallel streets, crossed by others at right angles, and every part of it is exposed to winds. Cospicua consists of narrow tortuous streets and numerous cul-de-sacs. The houses are mostly of an inferior description, and from their position they are not so freely exposed to the sea breeze as the other towns. None of these towns are so clean or well-kept as Valetta or Floriana, and we are desirous of calling the attention of the local authorities to them, as they stand in great need of thorough sanitary improvement.

We next proceed to consider the present state of the more important sanitary works.

Drainage.—Every street in Valetta and Floriana is drained. With very few exceptions the streets in Cospicua are also drained; but few or no public drainage works have yet been carried out in Vittoriosa or Senglea.

The extent and direction of the sewerage is shown in the Plan XXVII., and the following figure gives a section of one of the mains. The sandstone rock being very soft and easily worked, it is usual in forming a sewer to dig out a narrow trench 13 or 14 feet in depth.

FIG. 8.—SECTION OF THE PUBLIC SEWERS IN VALETTA.



This, when covered over, appears to have been the original construction of all the sewers. At present the sewer is built of sandstone blocks, and has a curved invert. The usual depth of the mains is 10 feet, and the width 2 feet.

Into these sewers is received the rain-fall during the rainy season, but none during the warmer half of the year. They also receive refuse water, and the drainage from privies in houses, &c.

There are several errors in this system of draining, which require notice. In the first place the sewers are very large, of altogether unnecessary dimensions, and quite disproportioned to the water-supply and rain-fall they have to carry away. As a result of this deposits take place, which give rise to great nuisance: because the sewers do not clear themselves, filth accumulates in them. During the dry, warm weather they become generators of foul air, and are detrimental to health.

Another important defect is the porous character of the stone of which they are constructed. This stone, wherever used for such a purpose, becomes infiltrated with sewage, and, in the course of time, the whole subsoil through which the sewers pass, becomes saturated with decomposing matter, and a source of foul air within the houses.

The stone is merely consolidated sand, and becomes infiltrated with sewage, just as if the drain were dug in sand, although of course in a less degree.

In carrying out the drainage of towns, it is absolutely necessary to provide, that when once the sewage matter has passed into the drain it shall have no opportunity of escaping into the subsoil, or of passing from the drain at all, until it arrives at the outlet. All drains should therefore be constructed of impervious material, and with closed joints. The Maltese system is opposed to this fundamental principle. Again, the section of a sewer should bear a proper relation to the quantity of water it has to remove, and also to the slope of the ground. The sections should be large enough to carry off the maximum rain-fall. The slope in the present case is so very rapid, and the distances to the sea so short, that, probably in every instance, the maximum rain-fall would pass easily through glazed earthenware pipes, laid in the bottom of the existing trenches.

Another great defect in the present drainage is the system of outlets. There are eleven of these for Valetta and Floriana, opening into the harbours. Several of them are of great size, they open above the water level, and, as they are quite unprotected, the wind blows up them into the general system of sewerage without hindrance. Attempts have been made to remedy the evil by building out the end of the sewer under the water; but such is the immense force of the sea during high winds, that the blocks of stone, of which the ends are built, are literally blown up by the impulse of the waves entering the large mouths of the outlets. This result is partly due to the circumstance that sufficient attention has not been given to the direction in which the sea advances to strike the sewer-opening, and hence the impulse is received more or less directly into the end of the sewer. Some outlets are cut out of the rock, and terminate several yards above the water level, causing nuisance by the filth being diffused more or less over the surface of the rock.

The outlets in all cases open so close to the shore, sometimes in narrow creeks, that the sewage is not diffused through a sufficient body of water to render it innocuous; and, as decomposition takes place very rapidly, there is much nuisance experienced even at some distance from the spot. Lower St. Elmo barrack suffers from this cause, and also Fort Ricasoli; but in the latter case it is the outlet of the barrack drainage which is at fault. There are three main outlet sewers close under the windows of the General Hospital, Valetta, which have been long a cause of complaint. One of the sewers passes at each end of the building to the sea, and one directly under its centre.

The obvious remedy for these defects of outlet is to terminate the sewers by iron pipes running into deep water, and properly protected from the waves, at a depth of three or four feet below the surface. The open end of the pipe should be turned away from the line of impulse of the sea, to prevent the wave dashing up the pipe and forcing the foul air back into the streets and houses.

The outlets for the sewerage at Cospicua were in a very unsatisfactory state at the time we were in Malta, on account of certain works at the dockyard having interfered with them. These outlets appear to have ended in the narrow dockyard creek, in a body of water too small to admit of sufficient dilution. In such a case as this it might be considered whether the sewage could not be divided, and part of it discharged into French creek or even Calcara creek. Anyway the present condition of the drainage in these towns would become very dangerous to health if an epidemic prevailed. A much larger body of troops are barracked in these badly drained and otherwise unhealthy towns than in Valetta, and all their sanitary works require the greatest care in execution.

Flushing.—We have seen that the rain-fall of Malta is confined only to the healthy months of the year, and that during the hot weather and most unhealthy months there is no rain. At the very time, therefore, when the sources of foul air should be reduced to the smallest possible extent there are no means of clearing out the deposit in the sewers carried into them from the privies and other sources of impurity. If the sewers were all relaid in the way we have suggested, and if there were sufficient water to maintain a constant current from the houses throughout the whole system of drains, no flushing would be requisite, but until combined water supply and drainage are carried into effect, a proper flushing tank, placed at the summit level of each line of sewers, is an essential element in the drainage; and the discharge of these tanks at sufficiently short intervals, to cleanse out the whole sewerage of the town, should be as much a part of police duty as ordinary surface cleansing.

Ventilation of Sewers.—All the main lines of sewers should be ventilated by shafts at the highest ends, carried up at a distance from the houses; and the opening of the shaft should have a wire box fitted in it containing a foot or 18 inches of charcoal powder, to destroy the sewer gas before it passes into the external air. Care should be taken to protect the charcoal from rain, and to renew it from time to time.

Trapping.—All surface gratings should be carefully trapped, especially those in the courts of houses.

House Drainage.—House drainage appears to be carried out in some form or other pretty generally, but it is of a very bad kind. There are no proper water-closets. In the better class of houses the substitutes for them are sloping troughs of the ordinary porous stone, with a hole at the lower end covered by a rough valve, which can be lifted up by a wooden handle. Water is either supplied directly by hand, or by means of a pipe from a water-vessel filled by hand at the top of the house. The arrangement is of a very rude description, and the stone, being porous, becomes speedily saturated with filth, and a constant nuisance. It is not self-cleansing like the ordinary soil-pan.

In the poorer neighbourhoods there is a sink of the most abominable and unwholesome description generally situated in the small court close to the doors. This sink is the depository of all the filth of the houses, which is carried from each by the inmates and thrown down. Anything like a proper water supply or trapping is of course out of the question, and the arrangement is nothing but an open cesspool connected with the town sewerage. There is usually a wooden lid or cover to the sink, but it is of little or no use in protecting the health of the people from bad drainage and foul air. We found this arrangement had been introduced, by the proprietor, into one of the most recently built blocks of dwellings for the working classes, notwithstanding the great advance in improved domestic appliances which has been made of late years.

In a matter such as this, which is intimately connected with the habits and state of civilization of the people, it is of course very difficult to lay down rules; but we consider that it would be very advisable in the local authorities to introduce gradually the system of soil-pans supplied with water, instead of the present unwholesome arrangements. A few soil-pans put up here and there would gradually lead to their more extensive use, and to the final disappearance of the present most unwholesome and dangerous system. In a number of places Macfarlane's latrines might be introduced with advantage, as has been lately done at the new market, provided there were sufficient water, and the cleansing of them were confided to the sanitary police. But in the meantime, as the state of the house drainage intimately concerns the health of the garrison, it should be improved, together with the public drainage. Glazed earthenware pipes should be introduced for houses and courts in place of the sandstone drains, and the present untrapped sinks should be abolished. This is essential for protecting the public health.

Surface Drainage.—The rapid slopes of the towns afford every facility for surface drainage. The paving generally is very good. In all close courts, however, it would be better to pave with hard in place of soft stone, as the former absorbs less water and is more easily cleansed.

Cleansing.—Valetta is now one of the cleanest towns anywhere to be met with. Of late years a much better system of police has been introduced, and the cleansing is well organized. Among such a crowded population the only safety consists in removing out of the town at once and without delay the whole refuse, whether of public streets, or of courts, or of houses, so that no accumulation or nuisance whatever should be possible. This is what the present police system professes to do.

The other towns are not so clean as Valetta, and they require to be placed under the same rigid system. The population is more crowded together, both in streets and houses, and many of the houses are of a very inferior character; circumstances which render it necessary to exercise the greatest care as regards cleansing.

There is one point in which greater vigour might be exercised with advantage to the public health, and that is in the cleansing, scraping, and lime-washing of the inner walls and ceilings of the poorer class of houses. This is one of the most important measures for preventing epidemic disease which can be adopted. These houses, in the course of time, get saturated with impurities, and all the walls, ceilings, and floors should have the surface removed and lime-wash applied to purify the stone. Lime-washing should be done once or twice a year, or whenever necessary, and the surface scraped at longer intervals.

There is power to lime-wash under the laws and regulations of the police. Quicklime should always be used for the purpose; and wherever there is fever, diarrhœa, small-pox, boils, carbuncle, or other similar diseases, the lime-washer should be set to work.

Generally in regard to the houses of the working classes, periodical inspection by a medical officer of health would prevent much sickness. This duty might in the meantime be devolved on the police physicians, who should be required to report, not only the existence of zymotic diseases, such as fevers, boils, small-pox, bowel complaints, &c., but also the local causes to which they are to be attributed, and the nature of the preventive measures required. All bad, close, musty smell indicates danger to health, and especially in such a place as Malta. These odours should be traced to their source, and their cause rooted out. Better drainage and house cleanliness, more water, with less overcrowding and more ventilation, would make a great difference in the present sanitary state of the population.

Nuisances.—The chief sources of nuisance are the sewer outlets already referred to and the public slaughtering-places at the head of the Great harbour, and at French creek. All the drainage from these establishments, and also from the adjacent commissariat slaughter-house, runs directly into the harbour; and, although it mixes with a considerable body of water, the water is stagnant, and the rapid decomposition which ensues occasions intolerable nuisance. Fortunately, there is no population near enough to suffer injury; but it is most objectionable to contaminate the water where there is no current to carry off the cause of nuisance.

We would advise the whole three establishments to be removed to a locality where the drainage could be utilized for manure, or where it would pass at once into moving water. This we understand is in contemplation for the commissariat slaughtering-place; the public establishments should be removed at the same time. These last were by no means sufficiently clean when we saw them, and require stricter regulation and supervision.

The provisions of the existing police law in regard to nuisances, &c., will be found in Appendix 8.

Water-supply.—The water-supply of the garrison and civil population is derived from rain-fall and springs. One set of springs, 10 in number, are conducted by the Wignancourt aqueduct a distance of about eight miles from the slope of the Bingemma hills. The aqueduct is carried on arches for a considerable part of the distance, and affords a supply to the population at various points along its course. The total yield of the springs in the dry season is about 537,000 gallons a day. About 200,000 gallons are drawn along the line of the aqueduct, and the remainder is distributed to public fountains, quarters, barracks, hospitals, and private tanks in Valetta and Floriana.

There is another aqueduct, called the "Fauara," which partially supplies the cities and barracks on the opposite side of the Great harbour. It derives its water from three springs yielding 92,000 gallons a day.

The other source of water is the rain-fall during the rainy season, which is collected from the roofs of houses, barracks, &c., and is stored in underground tanks. These tanks are also supplied from the aqueducts when the rain-water falls short.

We have given in Appendix No. 7. a return, furnished to us by the local government, of all the water sources and of the tanks, with their dimensions, which shows that within the lines there are 122 public tanks, with a capacity of nearly 30 millions of gallons.

In public institutions, barracks, &c., there are 152 tanks, with a capacity of about 25¾ millions of gallons.

In private houses there are 4,294 tanks, capable of holding about 323 millions of gallons.

The water-supply is hence stored up among the people. It is one of the necessities of the case that it should be so, because in the event of a siege the aqueducts would be destroyed, and Malta, as we have already seen, is without rain for a great part of the year

The tanks are cut out of the solid rock. They are carefully lined with cement to prevent escape of water, which, nevertheless, occurs; and they are arched over, leaving an opening above, through which the water is drawn by hand or by means of a pump.

The quality of the water is said to be very good throughout, except where there has been neglect in cleansing the tanks, which are apt to become foul, and the water unwholesome, during the dry season. The sanitary objections to this method of storing water are, that underground water-tanks are liable to pollution by infiltration of sewage or surface impurities, that they leak and waste the water, and that they render the basements of houses more or less damp.

The water is raised and distributed for use by hand labour, except in a few cases where there are open conduits connected with public fountains supplied by the aqueduct. This method, besides its inconvenience, limits the use of the water very materially; and one of the greatest improvements in the distributing arrangements would be to introduce a constant supply at pressure. Even the existing supply of aqueduct water, as we shall presently show, would yield nearly 7 gallons a head per day to the whole garrison, including troops, a fact which, when compared with the actual amount of water available for use, is sufficient to show the large extent of waste continually incurred by open fountains and by leakage from tanks. Both sources of waste could be easily avoided by improved means of distribution.

It will be seen from the report of the collector of land revenue in Appendix No. 7, that he recommends a constant supply to be provided for all civil and military buildings by pumping water from the existing underground tanks into cisterns at a sufficient elevation; but where there are such ample facilities as exist at Valetta, this method ought not to be necessary. If the aqueduct supply were extended and conveyed in pipes to distributing reservoirs placed on the higher levels of the towns, water might be sent by gravitation over every part of them, and would render efficient house drainage much more easy than it will otherwise be.

This improvement would render necessary the abolition of open fountains and the introduction of water pipes and water taps, but it would in no way interfere with the storing of water required during a siege, which could be resumed if it became necessary.

If we take the available water-supply for Valetta and Floriana, during the dry season, at 337,000 gallons a day, and the population of Valetta and Floriana, including the troops, at 36,000, the present aqueduct water supply would give about 9 gallons per head per day. The aqueduct supply for 25,000 people, including troops, in the other cities would give only 3½ gallons a head per day; but it is possible that it might be increased from other sources. If the present supply from both aqueducts were equally distributed over the garrison, it would give nearly seven gallons a head per day. Next to improved drainage an extension and proper distribution of the aqueduct water is the most necessary improvement for these towns.

Improvements already carried out.—We have already alluded to the improved sanitary condition of Valetta, which we have much pleasure in stating is likely to progress under the present enlightened government.

Besides many important reforms which have been carried out in the general administration of the island, the care of public health has not been neglected.

An ordinance against adulteration of food or drink (Appendix, No. 14) has been promulgated. Public squares have been planted, and European fruit-trees and improved breeds of sheep introduced. Great improvements have been made in the administration of charitable institutions. An excellent lunatic asylum for 300 patients has been built; a large asylum for aged and infirm poor, a hospital for incurables, a foundling hospital, and Magdalen asylum, and a prison for women, embodying all recent improvements, are about to be built. We have had much pleasure in giving our assistance as regards the sanitary details of the plans of these establishments, prepared by T. H. Wyatt, Esq., and when all are completed this little island will have the finest charitable institutions any where to be met with. The civil hospital, Floriana, has been improved. Drinking fountains have been established. An admirable public market on the most improved model has been built, at a cost of 17,000*l.*, and has been so well let that it returns a rental of 4,300*l.* per annum. Gas-lighting has been extended. All public and private water tanks have been repaired; 16 large new public tanks constructed; and an addition made to the water-supply by the purchase of a spring. Eight public ovens have been constructed, and dwellings for the poor on an improved plan are being built. 3,500 acres of waste land have been brought under cultivation on improving leases. Large public works, as, for example, the new harbour, which will cost 132,000*l.*, have been undertaken; employment has been given to a number of people; and mendicity, the curse formerly of Malta, has been considerably diminished by repressive measures.

An entire new suburb of model dwellings for the labouring classes will, in all probability, be constructed in connexion with the new harbour. Plans were advertised for, and several very good plans were sent in, one of which, after undergoing some improvements in detail, was selected as a model. The building ground will be leased subject to the adoption of the plan; and, as the improved houses are built, Valetta will be cleared of the old unhealthy tenements which are at present its opprobrium. Appendix, Nos. 12 and 13 show the steps which have been hitherto taken to give effect to this important improvement.

It is also proposed to lay out a new cemetery, to meet the wants of the civil population, and with the view of abolishing interments in churches, a practice which we are sorry to say still exists in Malta, although it has been abolished in all the more enlightened states of Europe, whether Catholic or Protestant. The civil government is very desirous of giving effect to this great improvement, in which we sincerely trust they will be supported by enlightened public opinion in the island.

Building improved dwellings, and a gradual reconstruction of the worst parts of the towns, with due regard to ventilation, light, drainage, and diminution of overcrowding, are no doubt the ultimate objects to be aimed at; but in the meantime the sanitary improvements we have pointed out in sewerage, house drainage, water-supply, internal cleanliness, ventilation, and general improvement of existing houses, are absolutely necessary for the preservation of the health of the garrison, and they would become doubly important in case of war. We strongly recommend their being taken up by the local government, and carried out, not only in Valetta, but in Vittoriosa, Senglea, and Cospicua, in many parts of which, especially of the last, they are most urgently required.

SECTION II.—SANITARY CONDITION OF THE GARRISON.

Before proceeding to describe the general sanitary condition of the barracks and hospitals, we shall state the nature of the diseases from which the troops in garrison have suffered, and the mortality arising from them.

1.—Diseases of Troops.

Full and satisfactory information on the health of the troops is contained in the statistical reports on sickness in the army, 1839 and 1853, and also in the report of the army medical department for 1859, digests of which are given in the Appendix (Nos. 15, 16, 17). From these reliable sources of information we learn that during the first period contained in the reports, 1817 to 1836, the corrected annual mortality was 18·7 per 1,000. Of this amount 2·9 per 1,000 was due to fevers, 3·6 per 1,000 to bowel diseases, and 6 per 1,000 to diseases of the lungs. The fevers were intermittent, remittent, common continued, synochus, and typhus. The first two fevers in the group, which are generally connected with local malaria, furnished one-eighth of the admissions to hospital from fever, and one-seventh of the deaths. The last three afforded seven-eighths of the admissions, and six-sevenths of the total deaths from fevers.

Common continued fever was the cause of by far the greater proportion of deaths from this class of diseases.

The bowel diseases were dysentery and diarrhœa, with a few deaths from cholera. The chest diseases were consumption and bronchitis.

The mortality from the zymotic class during these years was 6·5 per 1,000; adding to this 6 per 1,000 for chest diseases, we find that above two-thirds of the whole mortality were due to these two classes.

The group of years from 1837 to 1846 shows an annual mortality of 19·36 per 1,000. Of this 1·79 per 1,000 was due to fevers, chiefly common continued; 2·41 per 1,000 to diarrhœa, dysentery, &c.; 6·38 per 1,000 arose from tubercular diseases, such as consumption; and 1·65 per 1,000 from other diseases of the respiratory organs, chiefly bronchitis. We have again the two classes of zymotic and chest diseases affording upwards of two-thirds of the total mortality of these years.

A return (Appendix, No. 18) prepared for us by Inspector-General Forrest, late principal medical officer of Malta, for 10 years preceding 31st March 1859, shows that the deaths from fever were nearly a fifth part of the total deaths; that consumption furnished nearly a sixth part of the mortality. The deaths from diarrhœa, dysentery, and cholera were about 40 per cent. of the total deaths. The mortality from zymotic and chest diseases during these years (including cholera) was 84 per cent. of the total mortality, and, excluding cholera, about 50 per cent.

The last published return for the station, is that for 1859, in the army Medical Department report, which gives the mortality for that year at 19·02 per 1,000. No less than 8·85 of this was due to continued fever. The zymotic class gave a mortality of 11·11 per 1,000; consumption and other chest diseases gave 1·69; and the zymotic class conjointly with chest diseases occasioned 79 per cent. of the total mortality of the year. In 1859, 46½ per cent. of the deaths, and in 1860, according to a return furnished to us by Dr. Langley, acting principal medical officer, nearly 43 per cent. of the deaths arose from fever.

We have seen that among the civil population "boils" and "anthrax" prevail. Such affections also occur among the soldiers, but they rarely lead to fatal results. They are common in the army everywhere, and are generally included under two heads "boils" and "abscess." There were 637 admissions from these affections in Malta during 1859, and 632 in 1860. During the latter year there were 27 cases of the more severe form, "furunculus," and three cases of carbuncle ("anthrax") admitted, all of which recovered There were also two cases of "anthrax" in 1859. It may be here stated in connection, that in 1813, 28 soldiers were attacked with plague, of whom 21 died; a very small relative mortality when compared with what occurred among the civil population.

The prevalence of fever among the troops, and the high and increasing ratio which the mortality from it has attained, has attracted the serious attention of commanding and medical officers; and it was this circumstance which induced the late Lord Herbert to direct an inquiry to be made into its causes.

In doing so it is necessary to analyze the facts somewhat more in detail; and for this purpose we have obtained information from various sources, the results of which we proceed to discuss, beginning with the seasons during which fevers are most prevalent.

Dr. Burrell, in his report on the plague of Malta, has given the following table showing the relative prevalence of fever in the garrison from 1816 to 1851 inclusive, for the months during which plague prevailed in 1813:—

——	April.	May.	June.	July.	August.	September.	October.
Annual average Admissions (Military) -	20·8	24·9	47·1	82·5	75·4	70·4	34
Deaths from Plague among the Civil Population, 1813.	3	110	800	1,595	1,042	674	211

This table shows the monthly rate of increase of febrile disease among troops in Malta on 36 years of observation. We have given in Appendix No. 19, an interesting table prepared by Dr. Langley to show the monthly rate of sickness in the garrison, over a period of five years, 1855–60, in comparison with the fever rate. The month of July in each year furnishes the largest amount of fever, a result which corresponds with that given by Dr. Burrell. The months of July, August, and September are the fever months. The month of June follows next in order of unhealthiness from fever, and then the month of October. Here again we have a correspondence in the two sets of data, pointing to the same general law of the march of fever, and which becomes of greater interest when it is found to be the law of increase also of plague. As regards other diseases Dr. Langley's table shows that, taken as a whole, these diseases are less under the influence of the monthly law of increase, although the summer and autumn months are the most unhealthy.

The following table, giving approximately the probable ratios in which fever and other diseases may be expected to occur during each month in the year, is deduced from Dr. Langley's data. It shows that for every 15 cases of fever occurring in January 150 may be expected in July; while for every 16 cases of other diseases occurring in January 22 may be expected in July, and so of the other months.

——	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Fevers - - - -	15	17	19	15	22	85	150	91	102	45	26	22
Other Diseases - - -	16	14	17	14	15	18	22	24	23	22	18	16

Whatever may be the cause of fever in the garrison, it is obviously most active during the hot months of the year, at a period when there is little or no rain. Increase of other epidemic diseases besides fever has frequently been observed in dry seasons. Absence of rain, in warm climates especially, is attended by consequences of a very important kind as regards the public health. It denotes deficient means of cleansing; accumulated filth, especially in badly constructed sewers, or in open drains and channels, giving rise to malaria; failing water supply attended by a corresponding increase in the amount of organic and inorganic impurities in the water. Impure air, impure water, and an increase of epidemic disease are coincident, and on the other hand it is frequently observed that a heavy rain-fall taking place during the prevalence of an epidemic is attended by a great diminution of the disease. The cleansing power of the rain, leading to the removal of sources of foul air, a large supply of purer water, and abatement of disease are coincident. The sanitary condition of drainage and water supply at Malta is, as we have seen, very much under the influence of the rain-fall, and the facts appear to indicate that improved drainage connected with improved water supply in the manner we have recommended would lead to diminution of fever during the warm dry months of the year. As regards the prevention of fever among the troops, it is evident that precautionary measures should be put in practice specially in spring, before the increase of fever commences.

The next point of importance is to determine the localities where fevers have been most prevalent.

The earliest information we have on this point is contained in the statistical reports on sickness and mortality in the army, 1839, in which it is stated that the ratios of admissions and deaths from fevers have shown a remarkable diversity in different parts of the garrison. This is shown in the following table exhibiting the ratios per thousand per annum of admissions and deaths from fevers in each of the three districts within the lines for a period of eight years.

——	Valetta.	Cotonera.	Floriana.
Admitted - -	133	178	217
Died - - - -	1·4	3.5	4·

We have here the singular fact presented of the most healthy district in Malta, Floriana, affording the largest number of admissions and deaths from fever among the troops quartered in it. The information is given by the reporters, with the reservation that the data on which the calculations were founded were not in their possession, but admitting its correctness the fact at once arrests attention, and proves that the troops were exposed to some condition absent from the civil population.

When cholera first visited Malta, in 1837, it attacked the troops in barracks in the following order: Floriana, St. Elmo, Valetta, Cotonera. One officer, 47 men, 21 women, and 9 children died. Fever was very prevalent at the same time.

The same epidemic, as already stated, cut off 3,783 of the inhabitants of Malta.

In the statistical report of 1853 the prevalence of continued fever in the barracks on the Cotonera side is attributed to the state of the dry dock at the upper end of Dockyard creek.

The precise effect produced by residence in particular barracks has not yet been ascertained, although it will in future be deduced with some degree of accuracy by the new statistical forms. Appendix Nos. 20 and 21 show the kind of evidence at present available in dealing with this question. The first of these tables gives the admissions and deaths from fever among three corps located during the unhealthy season of 1859 in three sets of barracks. The annual mortality from fever among the 2nd battalion 3rd regiment at Floriana, Isola gate, St. Elena gate, was in the ratio of 6·1 per 1,000 strength. The annual mortality from fever among the 2nd battalion 15th regiment at Fort Verdala, Floriana, and Fort Manoel was 9·5 per 1,000. And the mortality from fever of the 2nd battalion 22nd regiment at Fort Manoel and Floriana, the former barrack being occupied during the whole of the unhealthy season, was 5·1 per 1,000. In the first two examples Floriana barrack and Verdala barrack were occupied for the same days exactly by each corps. The facts appear to indicate the existence of some special cause of disease in both barracks.

Appendix No. 21 shows the result of interchange of barracks by two corps of nearly the same strength,—the 2nd battalion 23rd regiment, and the 4th battalion rifle brigade,—at a time when both were exposed to an obvious cause of disease. The barracks occupied were Lower St. Elmo and Fort Ricasoli. The former has its foundations close to the level of the sea. The subsoil is damp, the drainage bad and offensive, and the barrack has insufficient external ventilation. Fort Ricasoli is well ventilated externally, except one series of casemates, where the fever chiefly occurred.

About the middle of September, 1859, the saturated ground of the barrack square of Lower St. Elmo was opened to lay down gas-pipes. The barrack was occupied at that time by the rifle brigade, which had been in it from the 1st March, 1859. From that date until the opening of the ground there had been two deaths from fever. The corps was moved to Fort Ricasoli on the 26th September, and appears to have been so injured by the malaria that six deaths took place at Ricasoli before the end of the year.

The 2nd battalion 23rd regiment was at Fort Ricasoli from the 1st March till the 26th September, on which day it relieved the rifle brigade at Lower St. Elmo. Up to that date there had been six deaths from fever. On the 23rd it came into the midst of the evil at Lower St. Elmo, and lost 11 men by fever before the end of the year. The evidence as to the effect of locality in this case is of weight when taken along with other facts.

More precise evidence as to the effect of locality is given in a table (Appendix No. 22) drawn up by Dr. Langley, showing the comparative prevalence of fever and of mortality from it, in well-defined groups of men living in the larger barracks between January 1st and December 31st, 1860. There were 1,267 cases and 24 deaths from fever in the garrison during the year 1860, and the following table gives the localities of 1,154 of these, arranged in the order of highest mortality:—

Barrack.	Fevers per 1,000 per annum.	
	Admitted.	Died.
Floriana	282	8·4
Verdala	290	7·
Lower St. Elmo	162	3·4
Fort Manoel	115	2·3
Isola gate and St. Francisco Couvre Porte, Vittoriosa	204	1·2
Ricasoli	295	1·16
St. James' Cavalier	1	None.

The whole of the evidence bearing on the question of locality gives of course only approximate results, because these are influenced by other causes than the mere position of the troops—as, for instance, the state of the hospitals, the general health of the corps, &c.; besides, one year's returns are not enough on which to found positive conclusions. So far as they go, however, they point to the same conclusion as the facts already mentioned, and exhibit rather a striking conformity with what happens to be the relative sanitary state of the barracks.

At the time we were in Malta the effect of Floriana barrack on the health of the troops was brought before us, chiefly on account of the large amount of fever which had come from it. In order to relieve the overcrowding, a part of the men had been placed in badly ventilated wooden huts in an adjacent bastion, having interchanged once with the men in the barrack. The facts as laid before us show that during six months of 1861, including the most unhealthy months of the year, there were 204 cases of continued and typhoid fever in a force of 716 men. The medical officer attributed the result to overcrowding and defective ventilation.

During the entire period which has elapsed since the first hospital records were kept in Malta, the prevailing type of fever has been common continued.

Out of 22,969 cases of fever admitted into hospital, of which we have accounts, 21,122 have been registered as of this type. Many of the cases have been very slight, and mild in character, passing off in a day or two, and apparently the result of exposure, but still entered on the records as cases of fever. Other slight febrile attacks, the result of debauch, have generally been until lately classed under the same category. A large proportion of these continued fever cases have thus been of little comparative importance, but, nevertheless, five-sixths of the deaths from fever have been occasioned by this disease. The type next in frequency has been remittent fever, which has supplied about 5½ per cent. of the fever admissions, and about 9 per cent. of the fever deaths. Intermittent fevers have been so rare as to make it probable that they were imported. Only 17 cases of typhus are on record; and typhoid fever appears for the first time in the returns for 1860, in which year there were 41 cases and 12 deaths from this disease, although from information supplied by medical officers it appears doubtful whether many of the fatal cases classed under the head of continued fever have not been in reality typhoid in character, or have become so during their course.

It is evident from what has been stated regarding the climate and topography of Malta, and from the nature of the severer types of this fever, that its cause is not connected either with the climate, except in the slight cases alluded to, or with the surface of the country; and that any local causes of the more severe forms are to be sought for in the barracks and hospitals, or in the sanitary condition of the neighbourhood where they are placed.

A similar remark is applicable to the prevalence of consumption. There is nothing in the climate to predispose healthy people specially to this or other chest diseases: although the hot season, with its dry and exhausting atmosphere, may tend to develop consumption in men who bring the seeds of it with them, and although the higher elevations in the island are unfavourable for existing chest diseases generally. But admitting all this, there is no reason connected with the country or climate why (as stated in the statistical report of 1853) more troops should die of consumption in Malta than die of the disease in Canada, unless the men are actually consumptive at the time of their arrival in summer; and in this case, whatever the climate may do to develop the disease, it is quite certain to find a potent ally in the present sanitary condition of the garrison. In pursuing the inquiry by examining into any local causes of unhealthiness, it is impossible to separate between the sanitary state of barracks and hospitals and that of the towns in which they are situated; any general causes of insalubrity affecting a district, will affect the barracks and hospitals situated within it. Defective town drainage, obstructed external ventilation, damp subsoil, or foul air from nuisances will taint more or less the atmosphere in and around barracks in the neighbourhood, and high temperature is an important element in calling these causes into greater activity. The larger Cotonera barracks and Lower St. Elmo are perhaps the most exposed to these general causes of insalubrity. But all of them contain sufficient elements of unhealthiness in their local position, construction, overcrowding, defective ventilation, bad drainage, and insufficient water supply, to account for most of the evil. Hardly any of the barracks are good, several are very indifferent, and some are very bad. The hospitals within the lines, where sick men are treated after removal from barracks, are the worst part of the accommodation—a fact not to be lost sight of in estimating the probable causes of mortality.

The natives of Malta are exposed to the same topographical and climatic conditions. They inhabit buildings constructed of materials of the same kind as those used in barracks. They are subject to bad drainage, dampness, filth, overcrowding, bad ventilation, inferior dwellings, and their domestic habits and food are not always of a healthy kind. They suffer from consumption and tubercular disease, and also from the usual tribe of zymotic maladies. Natives and British troops are exposed to the same local conditions, although in different degrees, and both suffer from the same classes of diseases. Although of course the British soldier is more likely to suffer from the heat and dryness of the climate, at least on his first arrival.

We next proceed to give the general results of the sanitary part of our inquiry, beginning with the local position and construction of barracks. We shall give subsequently the details regarding each barrack separately.

2.—SANITARY CONDITION OF BARRACKS.

The following is a list of the barracks and hospitals we have examined in the islands, their situation, and the regulation number of men in them, contrasted with what the number of men in each barrack ought to be for healthy occupation:—

Situation.	Name of Barrack or Hospital.	Regulation Number of Men.	Proposed Number of Men.	Deficiency of Accommodation in Men.
Valetta	Upper St. Elmo	226	181	45
	Lower St. Elmo	748	616	132
	Marsmuscetto	84	60	24
	St. James' Cavalier	136	118	18
	Strada Torre	476	None	476
	St. Peter's Lower Counterguard	269	138	131
	General Hospital	382 beds	—	—
Floriana	Floriana Barracks	560	362	198
	St. Francis Floriana	329	213	116
Ricasoli	Fort Ricasoli	412	300	112
Vittoriosa	Fort St. Angelo	118	80	38
	Vittoriosa Gate	120	—	120
	Couvre Porte	62	52	10
	Vittoriosa Hospital	146 beds	—	—
	Hired Hospital	56 „	—	—
Senglea	Isola Gate	277	231	46
St. Margaret's Lines	St. Francis di Paola	149	114	35
	St. Elena Gate	200	100	100
	Verdala	690	552	138
Cotonera Lines	St. Salvator	132	132	—
	Zabbar Gate	183	120	63
	St. Clements'	56	39	17
	Polvarista	252	216	36
	Zeitun Gate	41	41	—
Quarantine Harbour	Fort Manoel	317	258	59
	Fort Tigne	106	79	27
St. George's Bay	Pembroke Barrack	1012	1012	—
St. Julian's Bay	Spinola Hospital	42 beds	—	—
Citta Vecchia	Sanitarium	88 „	—	—
Gozo	Fort Chambray	395	—	—
	Fort Rabato.			

In these barracks and hospitals, exclusive of Chambray and Rabato, there is regulation space for 6,955 men, and hospital beds for 714 sick.

In describing the condition of these buildings it is necessary to state at the commencement that they appear never to have been constructed as barracks nor intended to be used as such by troops except on the approach of an enemy or during a siege. In the time of the Knights of Malta, the garrison was scattered all over the islands. The men lived with their families, and were only called together for special purposes. The great casemated structures now crowded with troops were at all ordinary times unoccupied, or they were used as stores and armouries. Lower St. Elmo was built for a store, and as a place of refuge for women in case of siege. Marsamuscetto barrack was a store. Floriana barrack, the most unsuitable building in the whole command for human habitation, was a sail cloth manufactory, where able-bodied old men, otherwise incapable of earning a living, were employed.

Vittoriosa hospital was a district armoury, and people are still living, or were so lately, who remembered the country people coming to it to deposit their clothing, and receive their uniform and arms. The barracks were only occupied by guards. It was not till a later age that the buildings were considered suitable either for troops or sick.

3.—Local Position of Barracks.

The lowest barrack in point of situation is Lower St. Elmo, the basement of which is damp from infiltration of sea water, for the parade-ground is only four feet above water level, and also from sewage and drainage descending to it from the higher levels. During a gregale the ground becomes soaked with wet. It is entirely enclosed by lofty walls, so that it can be looked down into like a pit, and the rooms are cut off from the sea breeze. The highest barrack is St. James' Cavalier, which is nearly 200 feet above the sea; it overtops the town, and is exposed to every wind that blows. Between these degrees of elevation all the other barracks are situated. They differ considerably as regards external ventilation. Fort Manoel, and Fort Tigné in the Quarantine harbour, are considerably raised above the water, and have a free and healthy exposure.

Upper St. Elmo, although at the foot of the slope descending from the upper end of the town, is at a considerable elevation above the sea, but its construction is not the best adapted for freely ventilating the buildings. Marsamuscetto barrack is exposed to the sea breeze on one side, but it is built against a lofty wall of rock, which, indeed, forms the end wall of the casemates, and it is not healthy. St. Peter's Lower Counterguard on the opposite side of Valetta, overhangs the Quarantine harbour, and is freely exposed to winds from north-east to south, but specially so to the sirocco. It is built against a wall of rock, and the lower tier of rooms are damp and unwholesome. Floriana barrack is about 100 feet above the water level, but is so enclosed by walls more lofty than itself that it has no external ventilation worthy of the name. St. Francis Floriana is situated in a public street, but is open behind.

Of the barracks to the S.E. of the Great harbour those in Fort Ricasoli have the best exposure. They are high, and their doors and windows face the N.W., except one line of casemates in the curtain facing the N.E. These casemates are unhealthy, and yield fever cases among their inmates, partly because the ventilation is obstructed by walls along the face of the rooms a few feet from the doors. Fort St. Salvatore is high and well exposed. Fort St. Angelo, which crowns the point of Vittoriosa, is in a high and healthy position, in the middle of the Great harbour. Vittoriosa, Couvre Porte, Isola Gate, and St. Francesco di Paola barracks are hemmed in by walls and other buildings, and have little external ventilation; while their proximity to the houses of the civil population of a crowded, not over-cleanly district is far from being favourable to health. Verdala barrack, a recently built one, is a closed fort surrounded by high walls, which cut off its external ventilation, and it is besides close to a densely peopled part of the town.

Barracks flanking gates differ in some respects; but none of them are good, except Polverista barrack, which is loftily situated, and is well exposed to the air.

By far the best barrack in point of situation is Pembroke barrack, St. George's bay. It is in the open country, and occupies the crest of a rising ground overlooking the sea at a sufficient elevation to ensure good drainage.

Leaving out Pembroke barracks, which are 3 miles N.W. of Valetta, above two-thirds of the garrison are barracked in localities in which external ventilation is deficient, a defect which can neither be wholly compensated nor removed.

4.—Construction of Barracks.

The general plan and construction of all the buildings now used as barracks within the lines, except St. Francis Floriana, has been determined with reference to the defensive works; and all of them, with two or three exceptions, are deficient in the requisites for health.

All of them are casemated buildings, generally in the curtains or flanks, and in only two or three instances are the casemates detached from the works with a passage round them. The works generally rise above the roofs of the barracks: the roofs being, in most cases, paved and used as platforms for guns.

An evident result of this plan is that the barrack squares and parade grounds are sunk far below the tops of the surrounding buildings; and, as most of the light and ventilation are derived from the court-yard, there is never a free circulation of air in the rooms, except during winds.

Rooms in detached blocks, if properly ventilated and not overcrowded, are much better than those built into the works, because the air plays more freely round them; and they are cut off from damp, which always more or less affects the air of rooms where one side, or one end, happens to rest against the earth or rock of the rampart.

The best example of these detached ranges is in Upper St. Elmo, and is shown in the following figure.

Fig. 9.—Plan of Nos. 1 to 10 Soldiers' Rooms, Upper St. Elmo.

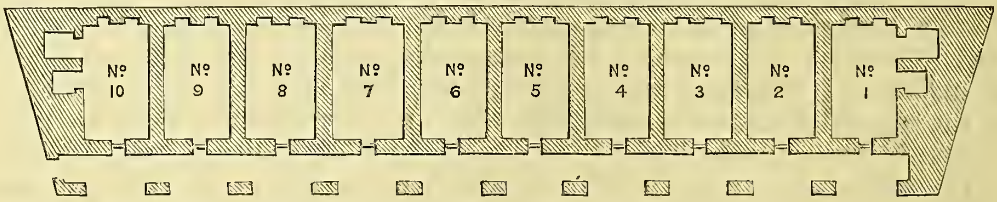
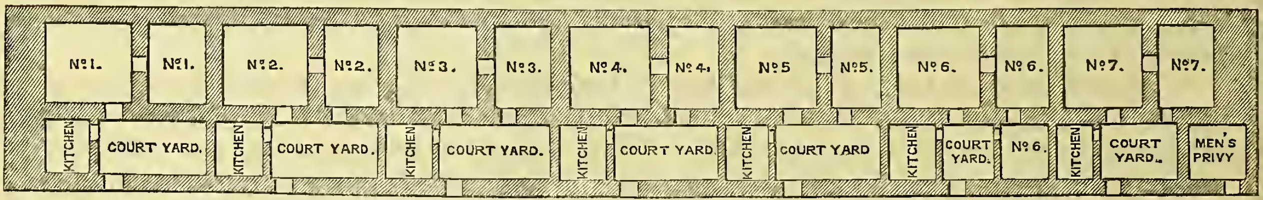


Fig. 9 is a ground plan of the lower floor. The rooms are all nearly of a size. They are 24 feet 5 inches long, 14 feet 8 inches broad. The side walls are 7 feet 2 inches high to the spring of the arch, which has a rise of 5 feet 4 inches. The front faces nearly due south, and is protected by an arched verandah. All the rooms, except the school room, have one small window over the door, and two in the wall at the end opposite the door; some of the rooms have an additional opening, but only part of the windows have glass, and these do not open at the top. The other openings have simply wooden shutters, which are usually kept closed. The rooms have each eight men in them.

Fig. 10 is a ground plan of a similar range of rooms in Fort St. Angelo.

Fig. 10.—Plan of Soldiers' Rooms, Fort St. Angelo, Nos. 1 to 7, and Men's Privy.



These rooms are on a ground floor only, and are connected two and two. Each pair of rooms has two small lights between them, and there is a wall in front higher than the door, which interferes with the ventilation. The rooms are arched, and have a flat roof.

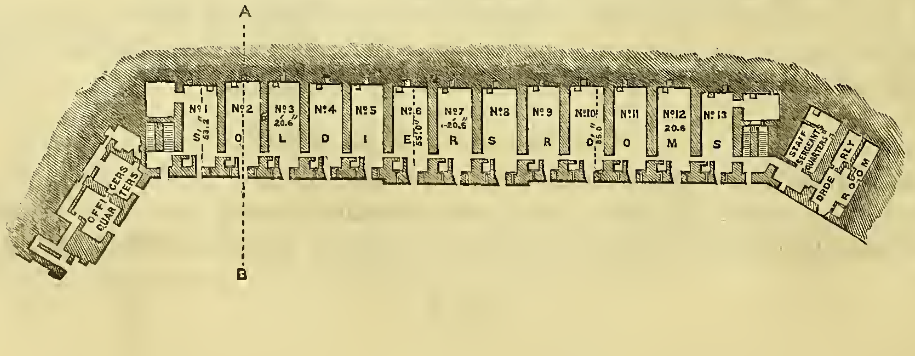
There are also detached blocks of casemate rooms in Fort Manoel.

There are numerous examples of very unsuitable barrack rooms forming part of the works, and where the situation is confined they are the most unhealthy portion of the accommodation.

Two or three examples of this form of construction will show how this happens.

Fig. 11 shows the construction of Lower St. Elmo barracks, which, as already stated, are entirely sunk below the surrounding levels. They consist of three floors of arched

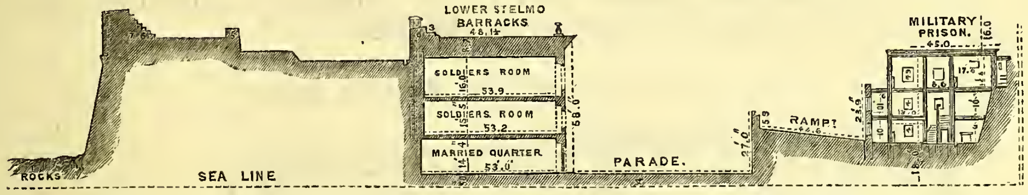
Fig. 11.—Lower St. Elmo Barracks.—Second Floor.



rooms built against the curtain, and of course without any windows at the end. The only opening to the outer air is a window into the sunk yard in front, and there are doors only at the ends. All the rooms on each floor communicate by arches at the front ends. The most distant beds are about 50 feet from the window. The rooms at present occupied, hold from 24 to 38 men each.

Fig. 12 gives a section across the barrack, showing the relation of the surrounding walls and sea to the barrack rooms; but the ground and buildings in front, above and behind the prison, as well as the walls of Upper St. Elmo, at the end of the parade ground, rise to more than double the height of the barracks.

Fig. 12.—Section through Lower St. Elmo Barracks and Military Prison.

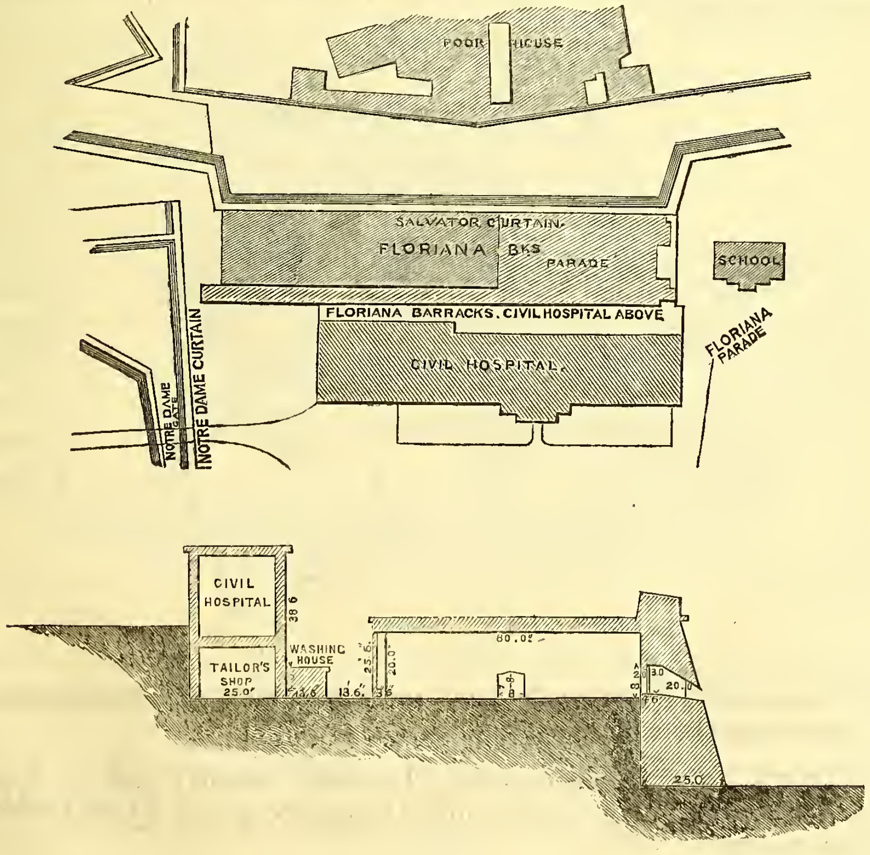


This building as already stated was originally constructed by the knights of Malta for stores, and was never intended for permanent human habitation. It has been occupied by troops in the face of repeated representations as to its unsuitableness. The ground floor is now given over for cook-houses, schools, &c. The two upper floors are still occupied by troops.

Marsamuscetto barrack, is another store erected by the knights which is now used for troops. The rooms are partly cut out of the soft sandstone rock which rises many feet above them; they are damp and unhealthy. It is stated that sappers who work all day in the open air do not suffer so much in them as other troops, who have less active exercise and exposure.

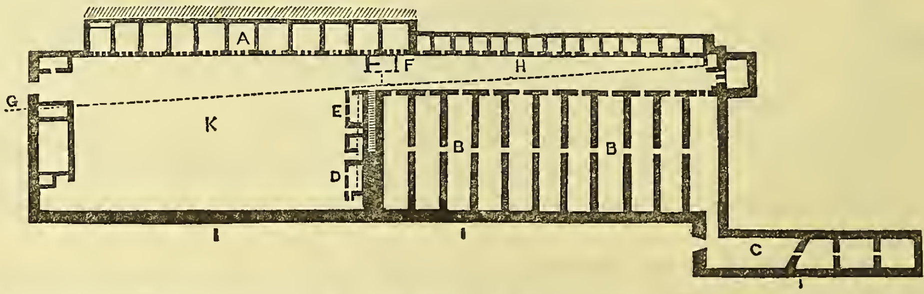
Floriana barrack, Fig. 13, affords a good illustration of the effect on health of bad construction *per se.* It stands high, and the position is as healthy as any in the healthy neighbourhood where it is situated; but human ingenuity could hardly have been more successful in adapting means to an end, if the end were to keep the barrack constantly full of stagnant foul air. There is, of course, the countervailing fact that the place never was built for a barrack.

Fig. 13.—Block Plan and Cross Section of Floriana Barracks, showing their Relation to the Civil Hospital.



This barrack consists of one set of small barrack rooms built against the hill-side without any opening behind. Over this range of rooms is one entire side of the Civil Hospital, which is built in two squares on the higher ground. This large building completely cuts off the ventilation on one side, and the rooms under it were so unhealthy that they have been removed from the construction as barrack rooms. The remainder of the barrack accommodation consists of a series of large casemates, 80 feet in length, with the ends opposite the doors, built against the parapet of the works, which rises above their roofs. They have a window over the door, and all the casemates communicate by arches in the division walls. No current of fresh air can ever reach the interior, for they are completely cut off from prevailing winds; as the men expressed it, "Our breath never seems to leave us;" and no wonder. The ground plan of these rooms, Fig. 14, and also the plan and section, Fig. 13, are sufficient to show the source of the fever by which these barracks have been so long infested.

Fig. 14.—Plan of Floriana Barrack Rooms.

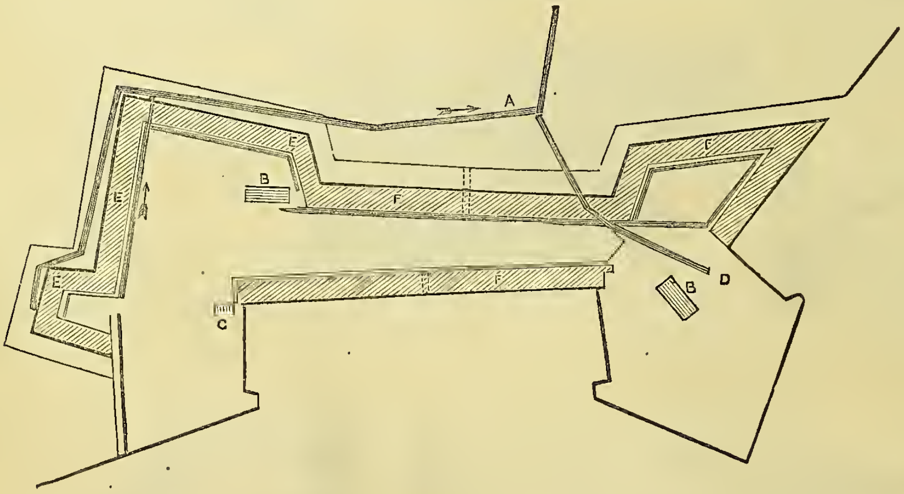


A. Range of barrack rooms, with the Civil Hospital over them.
B. Long casemates, with openings only at one end.
C. Casemates opening out of them.
D. Privies.
E. Women's wash-house.
F. Ablution shed.
G. Covered drain.
H. Open drain in a narrow passage in front of barrack-room doors.
I. I. I. Parapet rising above the barrack rooms.
K. Parade ground.

As elsewhere stated, this great defect of stagnant air has recently been partially remedied, by opening an embrasure through the parapet at the end of one of the casemates furthest from the door.

Verdala barrack, a plan of which is given in the following Fig. 15, is completely enclosed by its own walls and by higher ground. It is two floors in height, the upper one being reached by an outside terrace. The rooms are all arched, and have a door and window towards the parade ground; but towards the outer air there are only three small loopholes, 15 inches high by 3 inches wide, to each room. The outer ventilation is in this case also defective.

Fig. 15.—Verdala Barrack.



A. Drains.
B. Tanks.
C. Dung heaps, &c.
D. Privies.
E. Officers' quarters.
F. Soldiers' do.

Fort Tigné is enclosed by its walls in a similar manner, and the casemates are built with their ends against the walls.

Part of St. Peter's Lower Counterguard, (Lascaris) recently built, is found to be so damp and unhealthy as scarcely to admit of its being occupied; a result which has arisen in the following manner.

There are two floors of barrack rooms, but, except a small court, the surface of the parade ground is on a level with the upper-floor rooms, and all the lower floor rooms are sunk below its level, leaving only a narrow passage seven feet wide between the doors and a vertical wall of rock 19 feet high. The parade ground is moreover bounded on the side opposite the officers' and soldiers' quarters by a lofty escarp and walls cutting off the external ventilation on the north and north-west sides from which the healthy winds blow. The causes of disease arising out of the construction of the work are, want of fresh air, damp, and want of light.

Figs. 16 and 17 show a plan and section of this work.

Fig. 16.—Lascaris Counterguard, Valetta.

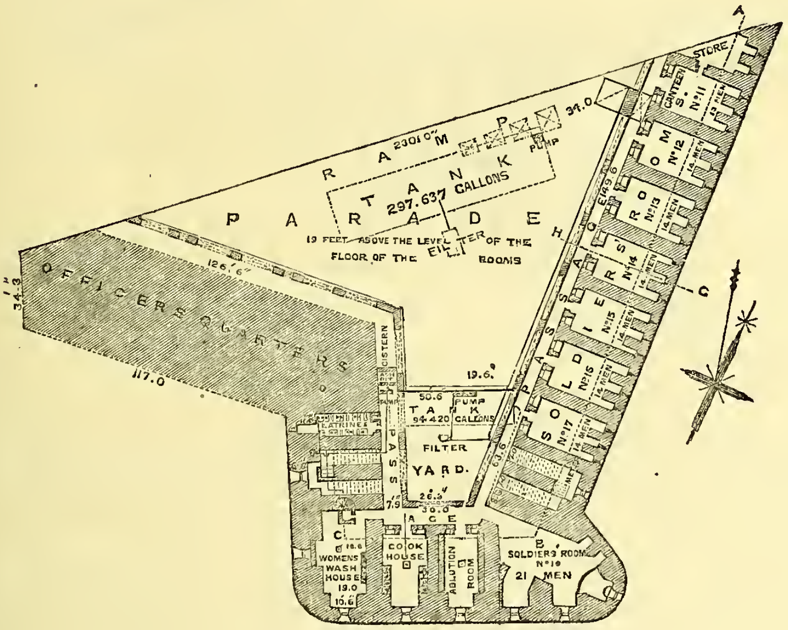
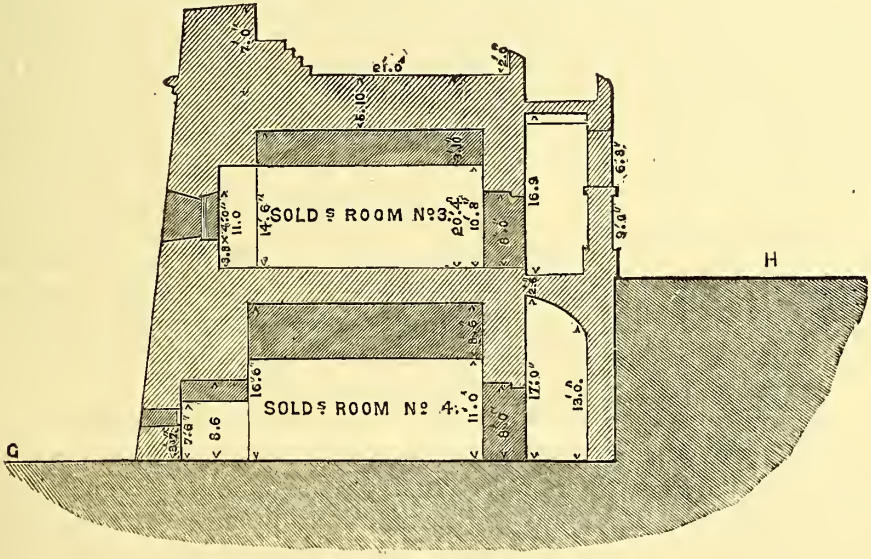


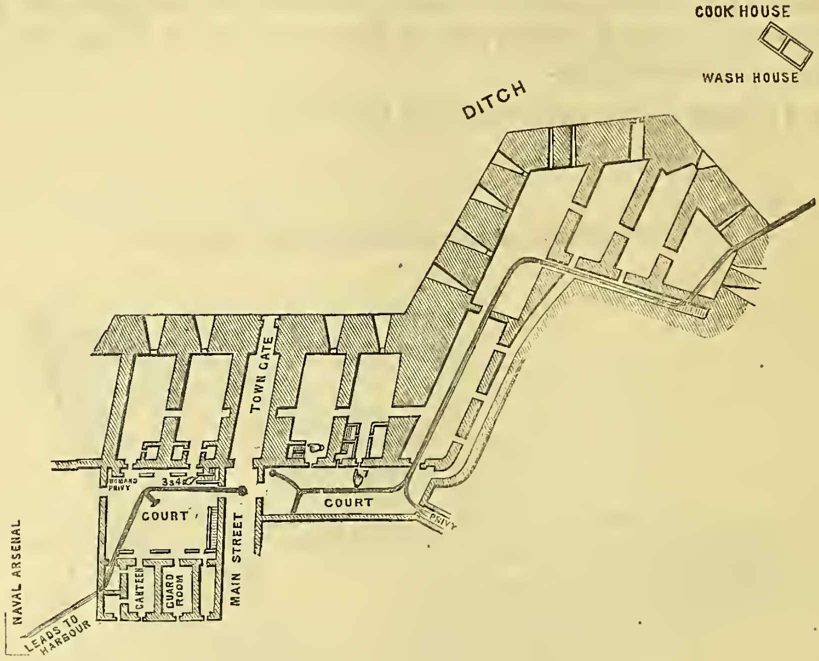
Fig. 17.—Lascaris Counterguard, Valetta.



The large casemates of Fort Ricasoli are of a different construction. They are built with one side against the defences, the rampart forming one of the piers of the arch. The other pier is a long thick wall strengthened with counterforts, and having windows at the spring of the arch. The lower parts of the counterforts outside are enclosed for married soldiers' rooms.

The barracks intended for the defence of gates are generally by no means healthy, on account of defective construction or position. Perhaps the worst of them is Isola Gate barrack, shown in the following figure.

Fig. 18.—Isola, or Senglea Barrack.



It is complicated in structure, dark, and at times damp. The rooms are completely enclosed by high walls, on one side and are very deficient in light and in outer ventilation. Some of them have windows at one end only, and others have no light except from embrasures.

These plans afford a good general idea of the nature of the barrack accommodation in Malta; and they exhibit the chief structural defects, especially in the older class of barracks. In not one of them has there been any successful attempt at combining the requisites of healthy construction with the purposes of defence; and, although they admit of some improvement, they will from their very nature occasion a certain annual loss from sickness, mortality, and invaliding, so long as they are occupied. Some are of course worse than others, but not one of them shows healthy casemated construction.

The new Pembroke barrack at St. George's bay is a very different building from any of the others. It occupies a healthy position; the rooms, have doors and windows at both ends, and they are freely ventilated. There are no higher walls of buildings to interfere with this essential condition of health.

Materials.—All the barracks are built of porous sandstone, which becomes saturated with water during the rains, unless the roofs are carefully protected by cement. On account of the great thickness of the casemated buildings, the walls retain much moisture, and also the rock near them and under their foundations, which is slowly given off during the warm weather, and is a cause of damp foul air. Wet sometimes comes through the arches and descends into the walls. This was recently the case with the new Pembroke barrack. But it can be prevented by making the roofs water-tight. No wood is used in constructing barracks; all the floors are of stone, and the upper floors are supported on arches. All stairs and passages are also of stone.

Experience generally has shown that wood floors are the most healthy. Maltese stone, from its softness, keeps the air more or less dusty, and the dust is breathed by the men; a fact not to be forgotten in relation to the amount of chest disease already mentioned. Wooden floors are liable to harbour vermin in Malta and when they once become affected in this way it is hardly possible to get rid of the vermin. Hard limestone should be substituted throughout for soft sandstone, a material quite unfit for floors, and by raising the floors when relaid, with ventilation beneath, damp would be cut off.

5.—Ventilation.

The ventilation of all the barrack rooms within the lines is defective. In many instances there is no provision except the very imperfect amount of door and window space we have described.

Recently foul air shafts have been introduced in several barracks. They are generally carried up in the back wall, at the end of the arch opposite the door, above the parapet, on the inside of which they open by means of a grated aperture. These shafts are sometimes of large dimensions, as at Lower St. Elmo, but generally they are very much too small to be of use. In some casemates, as for instance at Floriana barracks, there are ventilating openings in the crown of the arch. In a few instances there are inlets in the walls at the end most distant from the foul-air shafts.

In its general aspect the plan is the same as that described in our general report on the sanitary condition of barracks and hospitals in the United Kingdom.

However well that plan may answer for home stations in a cool climate, it is not sufficient for such a climate as that of Malta, especially where barracks are situated in close neighbourhoods, or surrounded by high walls.

Any stillness of the air in so hot a climate is far more injurious than at home, and such a condition prevails wherever the temperature of the air outside and inside the rooms is the same, and when there is at the same time no wind. This rarely happens in our climate, but it is common enough in warmer climates. For this reason, it will not do to trust merely to shafts and inlets for renewing the air in barrack rooms; although they should, as a rule, always be introduced wherever practicable.

At home we can depend on a certain measured quantity of air to maintain efficient ventilation, but in warm climates we have to depend for health rather on the *velocity* with which air is renewed or kept in movement, than on the quantity supplied.

This principle will be better understood by an illustration.

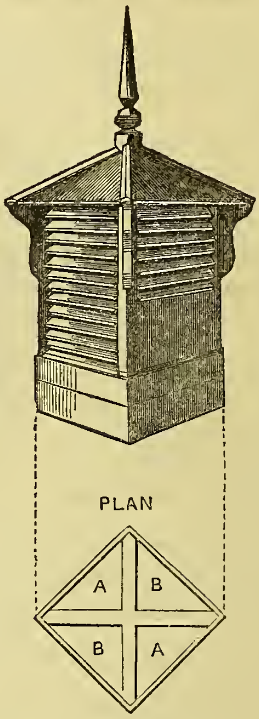
While inspecting the civil hospital at Valetta, we found two wards, side by side, and of the same size, both occupied by sick; they had the same number of male surgical beds, the same exposure, the same number of windows, and the windows of both wards were freely open, and to the same extent. The amount of open ventilating space was, in each case, very much more than would be necessary for keeping the air pure in wards of the same size at home. On examining the ventilation we found the air in one ward pure and fresh, while that in the other was close and stagnant. The reason was, that, in the first case, the air came directly from a distance into the ward by the open windows, and passed through it in a gentle current. In the other case there was a wall at a short distance in front of the ward windows. If this wall had been removed, the ventilation in both wards would have been equally good.

We found the same principle in operation in all the barracks. Wherever a free air-current could arrive without obstruction into any casemate, there the ventilation was comparatively good, even when the construction of the casemate was otherwise bad. Windows on opposite sides, or windows on three sides, we found gave very much better results than the usual doors and windows at one end. We have been in a barrack cook-house which was insufferably hot, although supplied with ventilating shafts several feet square; and we have been in a cook-house four times the size, which was kept cool and pleasant by three open arches at three angles. In the former case the cook-house was not exposed to the wind; in the latter case it was.

The ventilation of existing barracks in Malta is to be dealt with rather by the correct adaptation of these principles to suit local peculiarities, than by definite methods. Each barrack, or rather each room, requires a separate study. A careful examination should be made of the direction in which currents of air move towards or about the buildings, and wherever openings can be made into the rooms, especially near the top of the walls to receive the impulse of the current, such openings ought to be made.

In many instances, as at Floriana, embrasures could be introduced; in other cases additional glazed windows, capable of being opened, should be made, or existing windows could be enlarged. Wherever an air current is introduced in this way there should be other openings either opposite to the place where the current enters, or at right angles to the direction of the current; or, if neither can be obtained, openings should be made through the roof. These ventilating arrangements should be carried out as far as can be done with due regard to the defensive character of the works, until the air in each room is pure during the night. The nearer the ventilating windows or openings are placed to the crown of the arch the better. Ventilating openings or shafts carried up through the roof will always be found useful; and where there is no possibility of taking advantage of outer currents of air, shafts and openings must be relied on. The best form of shaft ventilator for Malta is Muir's louvred turret, shown in the annexed figure, because it takes advantage of any breeze which may be passing over the roof, and diverts part of it into the rooms below.

Fig. 19.
Muir's Ventilator



This will also be found one of the best ventilators for detached apartments, such as schools, chapels, guard-houses, &c.

Where barracks are in more floors than one, each floor should be ventilated separately; and all floors below the topmost one should have shafts carried up above the roof. It would be a safe rule never to have less than two shafts for a barrack room, adding one or two additional shafts in the longer rooms.

Openings made near the top of the arch should be louvred inside the room to throw in-flowing air-currents up towards the ceiling.

All shafts and ventilating openings should be made on a much larger scale than those for use on home stations. For foul air shafts the area should be one square inch to every 20 cubic feet of contents of the room. Provision should be made for contracting the fresh air openings by one half in case of cold weather. Plans X. and XI. exhibit these ventilating arrangements.

It must be kept in mind that the Malta barrack rooms have no fireplaces, and the ventilating power of the warm chimney-flue, which is of such importance at home, does not exist there.

In many barrack rooms where small loopholes are the only means of ventilation on one side, it is worthy of consideration, whether they might not be very much enlarged, and furnished with loopholed iron shutters to be closed in case of emergency: this would enable the ventilation of many rooms to be immediately improved.

The Maltese building stone is so soft and so easily worked that additional openings can be made in walls at a very small cost.

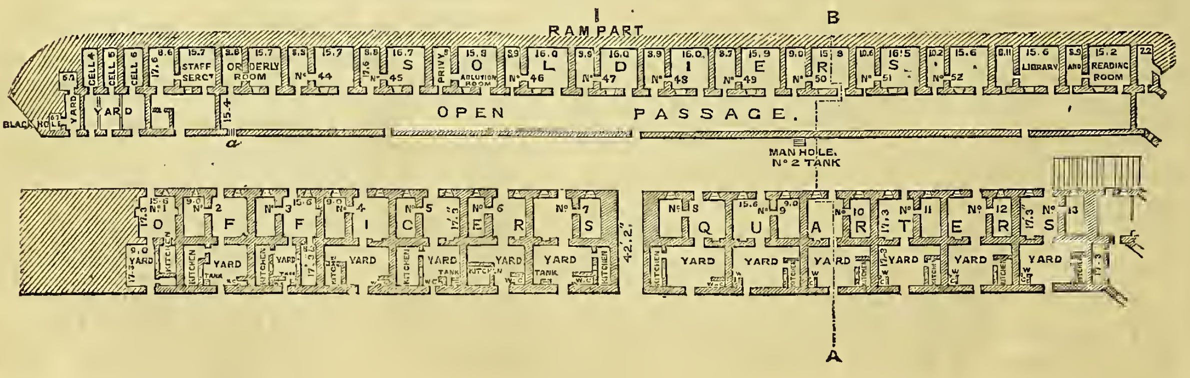
The neighbourhood of barracks should be examined to ascertain whether by removing any old buildings or old walls a current of air could be admitted to the barrack. In some cases good could be done in this way.

For example, at Fort Ricasoli there is a range of casemates in one of the curtains, the inmates of which, as we have stated, have suffered considerably from fever, although the position is elevated and close to the sea. The special cause of disease, in this instance, is that opposite the range, and a few yards from the room doors, there is a wall to screen the doors. The result is that this wall and the officers' quarters obstruct the free passage of the air about the rooms. But, besides this, the casemates have no through ventilation. The officers' quarters have also a wall behind them which keeps the breeze from the rooms. Both rooms and casemates are supplied with comparatively still air. The men in the casemates suffer from fever, and the officers' quarters are stated to be far from healthy.

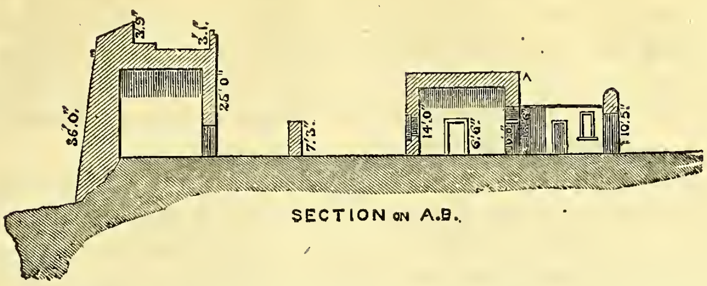
This error in construction is shown in plan and section in Fig. 20.

The obstructing wall might be removed with advantage to the ventilation. Another example of the same defect is afforded by Fort St. Angelo barracks, Fig. 10.

Fig. 20.—Fort Ricasoli.—Plan and Section of part of Barracks, &c.

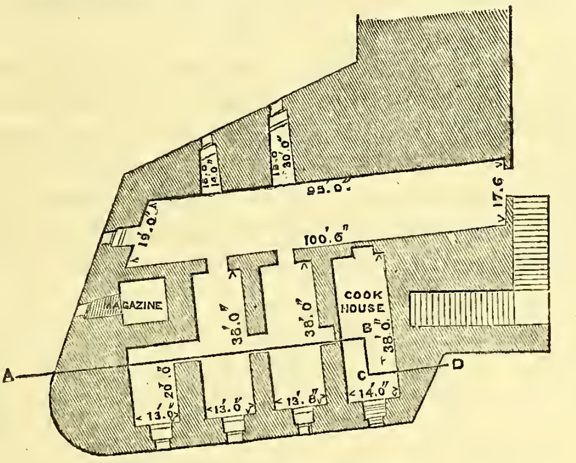


2.

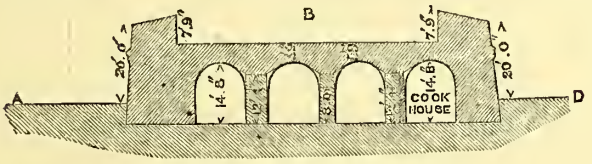


Fort Manoel contains 23 occupied casemates not built on a healthy model; but the largest of them, although by no means of good construction, affords an illustration of the main principle of ventilation applicable to this class of structures in Malta. The rooms in this casemate are a third of their height below the level of the ground. They are very complicated in structure, but as will be seen by referring to Fig. 21, they have doors or windows on all the four sides, so that they have the advantage of every air current outside. We found the air moving in every part of this large complicated casemate, and the atmosphere was comparatively fresh, although there were many men in the rooms at the time.

Fig. 21.—Fort Manoel.—Plan and Section of Soldiers' Quarters, No. 1, for 66 Men.



Scale of 10 feet to an inch.



The position of the windows is the only favourable point in this construction, and is our only reason for describing it.

By a careful adaptation of the principles we have laid down in the preceding pages and in Plans X. and XI., most of the barrack rooms in Malta may be sufficiently ventilated; but every case must be considered by itself, and returned upon until the rooms are found to be fresh inside by night as well as by day. There should be no draughts in a properly ventilated room; if the men complain of any it is because the work has not been well done.

6.—Space per Man in Barrack Rooms.

In permanent barracks at home stations the space per man is fixed at 600 cubic feet by regulation. This unit can be adopted with perfect safety, because the barrack rooms at home are only of limited height, rarely exceeding 10 feet, and the cubic contents permit of the beds being sufficiently spread over the floor to prevent material surface overcrowding. Constructed as our home barracks are, 600 cubic feet per man is therefore a convenient form for expressing the amount of space and area each man ought to have.

But if we were to double the height of the rooms, leaving the cubic space as before, we should have great surface overcrowding.

In home barracks, 600 cubic feet means about 60 square feet per man, which, with good ventilation, is enough for health in England. But in warm climates, and especially in close, badly ventilated localities, a much larger extent of surface is requisite. Keeping these principles in view we shall be better able to estimate the relation which the question of space bears, as regards health, to the other conditions arising out of locality, construction, and external ventilation, which we have described.

A Maltese barrack usually consists of a number of arches built side by side like a small viaduct; one end, or the back of the room being closed by a wall, with or without loopholes. The other end, or front, is also built up except the space for the door and window. The beds are arranged in two rows, with their heads to the piers of the arches. The height of the piers is generally from 8 to 10 feet, but in some cases it is 14 or 15 feet, and the arch rises 6, 8, or more feet higher.

The total height of the room to the top of the arch varies from about 14 feet to 16, 18, 20, 25, or 26 feet, or even more. We have given in the barrack reports the detailed measurement of every barrack room; and it will be evident, by referring to the data, that for these barracks the question of cubic space in relation to health, is merged into the question of superficial area per bed. If the same construction of barrack existed at home, it would be no longer possible to limit the space to 600 cubic feet per man, simply because the beds would be too close together, and it is impracticable to preserve health in a barrack room where this is the case.

In many of the Maltese barrack rooms the beds are as close together along the wall as they can be placed to leave any space between them. In Lower St. Elmo barrack the wall-space per bed is 4½ feet, the bed being 3 feet broad, so that there is only about 1½ feet between the beds. In Floriana barrack the wall-space is about 3½ feet only; in Ricasoli it is from 3½ to 4 feet; in Verdala barrack it is 4 feet 9 inches. In one 44-men room in St. Francis Floriana, the beds, if arranged along the walls, would touch each other.

The cubic space per bed, is, it is true, considerably larger on an average than that which has hitherto been allowed in home barracks, but the increase of space is all above the beds. We have thrown the results of this part of the inquiry into Table No. 23 in the Appendix, which shows the number of men in each barrack for every 50 cubic feet from 250 to 800 feet and upwards, as also the number of men in each barrack for every five feet of superficial area from 25 square feet to 70 square feet and upwards. The following abstract shows the results for the whole garrison.

CUBIC FEET.

250 to 300	400 to 450	450 to 500	500 to 550	550 to 600	600 to 650	650 to 700	700 to 750	750 to 800	Above 800.
No. of Men.	No. of Men.	No. of Men.	No. of Men.	No. of Men.	No. of Men.	No. of Men.	No. of Men.	No. of Men.	No. of Men.
60	349	829	530	1,076	927	754	703	112	331

SUPERFICIAL FEET.

25 to 30	30 to 35	35 to 40	40 to 45	45 to 50	50 to 55	55 to 60	60 to 65	65 to 70	Above 70.
No. of Men.	No. of Men.	No. of Men.	No. of Men.	No. of Men.	No. of Men.	No. of Men.	No. of Men.	No. of Men.	No. of Men.
127	385	709	2,429	979	458	270	44	58	148

This table shows that half the troops in garrison have less than 600 cubic feet per man, the amount fixed by the Royal Commission as indispensably necessary for health on home stations; but, what is of far more importance, it shows that the surface overcrowding in the great majority of barrack rooms is excessive. A fourth of the troops have less than 40 square feet per man. The whole garrison, except two and a half companies, have a smaller superficial area than would be deemed sufficient at home; and 150 men only have space enough for health.

We have in a preceding table given the accommodation in each barrack in contrast with the number of men the rooms ought to contain, with due regard for health, and to the local position of the barrack. The following are the totals of this table for the garrison.

Present Regulation Number of Men.	Proposed Number of Men.	Deficiency of Accommodation in Men.
6,955	5,014	1,941

It appears, therefore, that to keep up the present strength of 6,955 men, it will be necessary to find barrack accommodation for 1,941 men.

In such a climate and in so confined a garrison as that within the lines at Malta the superficial area per bed should not be less than from 60 to 70 square feet, and in calculating the accommodation we have kept as near as possible to the smaller of these areas.

Our inquiry then has led us to the conclusion that the barracks in garrison are very much overcrowded; and that they are consequently very defective as regards ventilation.

Nearly all of them smell close and musty in the daytime when the men are out; and it seems as if the stone-work were saturated with foul air. The conclusion has forced itself upon us that there is quite enough in these insalubrious conditions, when combined with closeness of locality, and sometimes with dampness, to account for the fever from which the troops suffer, and also for much of the predisposition to chest disease which prevails. The conditions are in truth very much the same as those which have existed in barracks at home, aggravated in Malta by local peculiarities as to position, by casemated construction, and by higher temperature.

The removal of overcrowding resolves itself into providing additional barrack accommodation for 1,941 men, and the question is how this is to be done. We shall presently describe the state of the hospitals, and we shall show how unfit they are for sick. We shall propose to build proper hospitals, and if this course be taken the existing hospitals may at a moderate outlay be made to accommodate 1,000 men. There are no married solidiers' quarters, and it is a matter of urgent necessity that such quarters should be built. These will hold about 400 men, and, together with the hospital buildings, they will reduce the number for whom new barrack accommodation will have to be built to about 500 men. There are several convenient sites where this additional accommodation might be placed. A barrack for 112 men could be conveniently built for Fort Ricasoli; another for 59 at Fort Manoel; another for 38 at Fort St. Angelo. The remainder should be provided for in situations where additional room space is required.

Wherever new barrack rooms are to be built the site should be open, and the buildings should be freely exposed to the northerly winds. The new constructions should be so placed as not to interfere injuriously with the external ventilation of existing barracks. They should be planned on the principles already laid down in the preceding pages of this report, and shown in Plans I., II., and III.

At Malta the walls of inhabited rooms should be built hollow for coolness and dryness. Verandahs are not essential, but are convenient for communication in the hot and wet seasons.

7.—Drainage.

All the barracks are drained into the harbours or sea, except the small gate barracks on the Cotonera lines, which, from want of outlet, are drained into cesspits. The drains are cut out of the porous sandstone rock, in the same manner as the town drains are, and are of dimensions quite disproportionate to the amount of fluid they have to carry away. For instance, the small barrack of St. Francis Floriana, which affords accommodation for 333 non-commissioned officers and men, is drained by a sewer 5 feet deep and 2 feet wide.

The new Verdala barrack, with about double the accommodation, is drained by two main sewers, the largest of which is no less than 10 feet deep and 2 feet wide. It is quite impossible to ensure safety to health with such immense sewers. The water-supply during the wet months of the year cannot keep such sewers clean; and in the hot months when there is no rain there is a mere driblet of water, and they become cesspits generating foul air.

The faults in size and construction are the same as those already noticed in reference to the town sewers, and they lead to similar results, giving rise to nuisance in certain states of the wind, and to saturation of the porous sandstone subsoil with sewage matter, and foul air.

In several instances the sewers are very imperfectly known, and appear never to have been examined and registered. This is the case with those for draining Upper and Lower St. Elmo. The drainage of the latter barrack is very bad. The sewers appear to be only long cesspools; and the ground is so saturated with foul matter, that the outbreak of fever already mentioned, which extended even to Upper St. Elmo barracks, overhanging those of Lower St. Elmo, was attributed by Inspector-General Forrest to the ground having been opened to lay down gas-pipes. The drainage of Upper St. Elmo, and of the military prison, is carried into Lower St. Elmo sewers, and these, from their low level, do not discharge themselves, so that the cesspits connected with them have to be emptied by hand once a week. This state of the drainage is most dangerous, and requires immediate remedy.

The outlet of the drainage at Fort Ricasoli gives rise to great nuisance on account of the foul matter spreading over the rock before passing into the water. A result of this is that smell is experienced in the nearest barrack room, which, although the most exposed to the sea breeze, is not so healthy as it ought to be from its position.

The parade grounds are drained for removing surface water, and the drains are trapped. Sometimes the traps become choked after dry weather, and the rain-fall lies on the surface. Not unfrequently the paving and guttering are in a bad state, especially the latter. At Floriana barracks we found foul water lying in a long open drain before the doors of the casemates, a nuisance which even in this climate could not be permitted with impunity.

At the smaller gate barracks, such as Zabbar gate, the refuse water is carried away by hand and thrown on the ground. The privies of these barracks are over cesspits, and one of them, at Polverista gate, gives rise to considerable nuisance on the public highway during summer, but especially during the operation of cleansing.

The whole system of drainage connected with the barracks requires examination and revision. Every drain and sewer should be ascertained, and its details described, mapped, and figured. Glazed drain-pipes carefully laid, and with water-tight joints, should be substituted for the present large porous sewers, which should be cleansed and filled up. The sewers should be trapped where they join the town mains; and they should be ventilated by pipes carried above the highest part of the barrack, the upper end of the tube being covered by a box of powdered charcoal to destroy the gas. Where there are latrines placed at the higher end of the sewer, they will ensure its whole line being flushed out daily; but where there are drains into which filth is liable to be thrown, without water to carry it away, provision should be made for discharging water into the upper end of the sewer to sweep it clean from deposit. When barracks have a separate drainage outlet it should be carried into deep water by means of an iron pipe in the manner already recommended for the town drainage. Care should be taken that the pipe is sufficiently large to remove easily any amount of drainage likely to pass through it, and the end should be laid to prevent the waves being forced up the sewer during heavy seas.

8.—WATER-SUPPLY.

The sources of water for the barracks are the same as those for the towns, viz., rain-fall and the aqueducts.

Every barrack has one or more large tanks dug in the rock. The total capacity of those of military buildings is 12,500,000 gallons. Water for filling them is collected from all the available extent of roof, and from the works; and most of them have a connexion with the aqueducts, by which they can be filled. The aqueducts, which supply a large part of the water required, would of course be cut across in case of siege, and the garrison would have to rely on the rain-fall entirely. If the tanks were all full, they would afford 6 gallons of water per man per day for 11 months for a garrison of 6,000 men. In some cases, at present, the water falls short; and the quantity required even for the most needful purposes has to be carried by fatigue parties. This was the case at Verdala barracks, also at Fort Ricasoli, where two of the tanks were leaky, and water had to be brought by the Commissariat, and stored in open wooden barrels on the parade ground, where it soon becomes warm and unfit for drinking.

The stored rain-water, if kept free from impurities by being passed into the tanks through filters periodically cleansed, and by proper care being taken to allow all the roofs, &c., to get thoroughly washed by the first rains before the storing is commenced, will of course be nearly as pure as the rain itself. As drawn from the tank, this water is found to contain a small quantity of saline matter, chiefly chlorides, arising partly from salt water being carried into the air by high winds during the rainy season, and partly from spray falling on the roofs, &c. of the more exposed barracks, and leaving a deposit of salt. The aqueduct water is stated to contain a small quantity of sulphates, besides chlorides. Both waters appear to be clear and good; but the tanks are liable to several disadvantages. First there is often a large quantity of ova of musquitoes and other insects diffused through the water, a nuisance for the destruction of which the natives are in the habit of keeping eels in the tanks. Secondly, towards the end of the dry season the tank water is apt to become impure from the deposit at the bottom. We have seen such water so muddy as to be quite unfit for use. The remedy for both evils is careful periodical cleansing of the tanks at the end of the dry season, and filtration of the water of each barrack, on one general system, both before it enters the tank and before it is used for drinking. The ordinary Malta filtering-stone does not answer. It is slow in its operation, and is too convenient a vessel for depositing filth in to be safe. In one case we found a filter half full of oyster shells, and of course disused. Another serious disadvantage arises from the fact that some tanks are too close to the sea level and derive saline impurities from this source.

A water inspector should be appointed whose sole duty it should be to attend to the water supply of all barracks and hospitals; to see that this is kept in a wholesome state; that tanks and water filters are properly cleaned and in good repair, and that they are freed from all sources of impurity. A downward and upward filter, as shown in Figs. 1 and 2, forms a simple and efficient arrangement for filtering water before it enters the tank.

Water is generally raised from the tanks by a rope and bucket slung over a pulley. In some barracks there are hand pumps. Every tank should be provided with a pump, and one or more cisterns to be filled by the pump should be placed in convenient situations, for the water to be laid on from them, for all purposes. A bucket is a very objectionable method of raising water, as it stirs up the impurities at the bottom of the tank, and requires a large open hole to be kept in the top of the tank, through which extraneous filth is very liable to gain admission.

There is no such thing as a constant water supply for either barracks or hospitals, and, as one result, all the purposes for which water is used, ablution, cooking, latrines, &c., are carried out in these permanent barracks on the same principle as if the garrison were an army in the field. It is quite necessary that the means of distribution should be brought more into conformity with modern usages, not only for convenience, but for health. Every barrack should have water laid on constantly for all purposes, such as ablution, bathing, cooking, drinking, and supplying latrines. Without it proper cleanliness can never be carried out. Every barrack should also have drinking water constantly at hand at all convenient points. In such a climate this great convenience is even more necessary than at home. Filtration, on the plan recommended above, should be carried out at the same time.

If improved means of distribution by distributing reservoirs and by laying down water pipes were introduced, the present daily amount of water delivered to Valetta by the aqueduct (about 9 gallons a head per day) would be more than enough for all purposes of the garrison and civil population, but the water supply on the Cotonera side of the harbour would certainly not be sufficient. Under the present arrangements for distribution, and the waste incurred by it, it is very doubtful whether sufficient fresh water could be spared for the latrines, after the additional amount required for ablution rooms and baths has been provided. Should it be found on trial that there is a deficiency, it will be requisite to use sea or brackish water for the latrines. The latter could be obtained from wells sunk near the sea shore. This water would have to be raised by manual labour, or by a small windmill at each barrack where it was required, into a cistern containing two or three days' supply at the rate of at least 1½ gallons of water per man per day. This method would be applicable to Fort St. Angelo, Fort Ricasoli, and Fort Manoel. But the wiser plan would be to improve the fresh water supply from the aqueducts, both in Valetta and Cotonera, first by improving the method of distribution as suggested, secondly by increasing the amount of water obtained from the sources, if necessary. The improvements in water supply we have recommended are indispensable for enabling the sanitary condition of the civil population to be ameliorated, and they would include the barracks also.

9.—Ablution and Bath Accommodation.

The means of personal cleanliness throughout the garrison are very deficient, and require entire reconstruction. In a warm climate any means of washing will not answer; there must be certain facilities and inducements to cleanliness held out to the men, and, unless they are supplied with these, no supervision will ever keep them clean.

In four barracks—Fort Manoel, Fort Tigné, St. Elena gate, and St. Francesco di Paola, there is no ablution or bath accommodation. At St. Elena gate the men wash in the public street before the barracks, if they do not wash in the rooms. At Fort Ricasoli the ablution accommodation is very imperfect, and practically of little use. At Upper St. Elmo the only water laid on to the ablution bench is salt water. Soft water has to be carried by hand. There is an ablution shed at Floriana barracks so placed as to obstruct still further the ventilation of the passage form which the air enters the barrack rooms. At Isola gate water for ablution has to be carried 50 yards to an open shed. Lower St. Elmo is the only barrack in which water is laid on, from the circumstance of its being below the level of a large excavated tank close at hand; but whenever the water in the tank is drawn off to a certain depth, the ablution benches are left without water, and it then has to be carried by hand.

The ablution accommodation in barracks provided with it is either a lean-to shed or a casemate. There are stone benches along the walls, sometimes hollowed out into troughs. The usual iron basins are provided for washing. There is generally a drain in the floor, into which the foul water is poured. The porous nature of the stone keeps the ablution room constantly soaked with wet. The rooms are generally deficient in gratings and pegs. There are no baths; but, as all the barracks are close to the sea, there are bathing parades, except during winter. Sea-water bathing is not sufficient for the purposes of cleanliness, and were it possible to provide a sufficiency of fresh water, it would be most advisable to construct baths. If this cannot be done, it might be worth while to make a trial of a few baths with salt water, and to issue marine soap. The consequence of the present deficient means of cleanliness is, that the same water is not unfrequently used by several men, to avoid the trouble of carrying from a distant pump; and it is suspected that the spread of ophthalmia is in some measure due to this practice.

We have no hesitation in recommending an entire reconstruction of the ablution accommodation. There is no objection to sheds, provided they be large enough and enclosed, nor to casemates if properly lighted, ventilated, and fitted up. There should be at least one basin to every ten men which the barrack will contain; and instead of the present moveable basins and a large mass of wet stone-work on which they are placed, we would advise the introduction of a constant supply of water from a raised tank, and the adoption of slate slabs with strong white earthenware basins sunk into them. These basins should each have a valve discharging apparatus. The water supply cock should be sufficiently large to fill the basin rapidly, otherwise the men will fix it open; and the cock should be weighted to close of itself. Fixed foot-pans, similarly supplied with water, should be introduced into all the ablution rooms. These improved ablution arrangements are shown on Plans XV., XVI., and XVII.

10.—Cook-houses.

All the barracks are provided with cook-houses; they are generally in casemates, and, with few exceptions, are very deficient in light, and especially in ventilation; some of them indeed are so hot that it is almost impossible to remain in them. Generally the only light and ventilation is from the doorway, or from an opening above the door.

They are provided with the usual barrack boilers, and ovens have recently been introduced into some of them; but these have been constructed so as to consume too large an amount of fuel, and the men do not use them. The improved steel ovens and boilers, Plan XVIII., should be introduced without delay in every cook-house. The saving in fuel which would result would repay the cost of the change in a short time. In order to prevent mistakes, we would recommend that the first boilers and oven sent out should be in charge of Mr. Roberts, C.W., who is practically conversant with the manner of setting them. Mistakes in setting have occasioned failures at home.

To increase the ventilation openings should be made wherever an air-current can be obtained, and shafts should be carried up through the roofs. The cook-houses should have ample ventilation and plenty of light. They should be provided with a place for coal, to be filled from the outside, and a sink. Water should be laid on to the boilers and to the sink. A long table should be placed across the room, on which the dinner should be served, and this table should be so arranged as to separate the men who come to carry away the dinner from the rest of the kitchen. A table is better than a counter, because it would allow any dirt underneath to be seen, and the cook-house to be more easily cleaned.

An improved cook-house of this description is shown in Plan XIX.

11.—Women's Wash Houses.

The accommodation for washing barrack linen is very deficient. In several barracks there are no wash-houses.

Where they exist they are in casemates or in open sheds. They are seldom furnished with boilers; there are instead small open fireplaces, over which the linen is boiled in small pans. There are no fixed washing conveniences. Usually there are benches for moveable tubs, but no proper drainage, and no water laid on.

Generally the means of providing clean linen are as defective as the means of personal cleanliness.

Wash-houses in which the women could wash and iron clothes should be provided at such places as appear most convenient. The building should contain two rooms, both amply lighted, and ventilated by louvres in the roof. One room should be fitted up as a wash-house, the other as an ironing room. The wash-house should have fixed tubs with cold water laid on from a raised cistern; the best source of supply for which would be the rain water tanks on account of the greater softness of the water. Boilers in which the clothes could be boiled or from which hot water could be procured should be supplied in the proportion of one boiler to about four tubs. The tubs should be emptied through the bottoms into an open drain arranged to carry off the water rapidly and directly away from the wash-house. An open drain is easily kept clean, and is not liable to be stopped up. The floor should be flagged and wooden gratings provided. The wash-house should be furnished with a coal box placed in a recess.

In the climate of Malta a drying stove would be unnecessary. The ironing room should have plenty of light round the three sides not adjacent to the wash-house, and a table not less than 2 feet 6 inches broad, all round, for ironing. *See* Plan IX.

12.—Latrines and Urinals.

Except two or three of the gate barracks, all the barracks within the lines are provided with water latrines of a kind commonly used in Malta. They consist of a trough of soft porous stone, the bottom of which has a slope towards an outlet-pipe at the lower end. The opening of the pipe is closed by a ball valve, which, when raised by a lever, discharges the contents into a drain. With few exceptions, water is not laid on to the privies, and the practice is for the men to carry all ablution-water and other slops and to throw them into the trough. Water so supplied affords the only means of flushing or cleansing.

Often there are no seats, except a bar, and no divisions between the seats. In the recently constructed work at St. Peter's lower counterguard there are seats, divisions, and partial doors. The usual position of the privy is in a casemate, without anything like sufficient light or ventilation, and, generally speaking, the places are noisome and unhealthy.

The only good point about them is the adoption in principle of the water latrine, but in every other point they are very defective.

The material used is so porous that the substance of it is completely saturated with filth, and is itself a constant source of nuisance. The water-supply, except in two or three instances, is only of a casual kind, and yet this is one of the points of greatest importance wherever water latrines are in use. The trough should always contain water, and there should be a tank or other supply at hand to allow of the trough being filled and flushed out several times a day, in proportion to the number of men using it, to prevent nuisance.

The kind of seating in use prevents the possibility of cleanliness in the latrine, and the want of divisions and doors is contrary to decency. The most difficult point is how to increase the light and ventilation; but both objects might doubtless be accomplished in most instances by openings through the crown of the arch or in the walls.

Macfarlane's iron latrine, or Jennings' earthenware latrine, Plans XII. and XIII., should be substituted for the present trough, because they are of impervious material, and have combined in their construction the best form of seating, divisions, and doors. Both require a water-supply, and also regular mopping to keep them free of smell. Jennings' latrine exposes less evaporating surface than the other.

We consider these improvements as of primary importance to the sanitary state of barracks in such confined spaces, and where the latrines have to be placed close to, sometimes in contact almost with the men's rooms.

The urinals are porous stone troughs of the ordinary construction, and extremely offensive, especially when placed near the latrines. They have no water-supply, and their material does not admit of sufficient cleansing. Slate or earthenware urinals, on Plans XIII. or XIV., are required for every barrack, and there should be water at hand for daily cleansing.

Urinals for night use, near the barrack-rooms, but in a closet outside the rooms, should be put up wherever it is possible, and urine tubs dispensed with. But many of the rooms are so constructed that it would be very difficult to find places in which to put the urinals with due regard to ventilation. Wherever this can be done, however, night urinals should be introduced. The room or closet in which the night urinal is placed should be completely cut off from the barrack rooms by a lobby with cross ventilation. The closet should be perfectly light, to ensure cleanliness, and abundantly ventilated. The form of urinal may be that recently constructed by Mr. Jennings, as shown in Plan XIV. In our detailed reports on the barracks, we have not recommended these urinals for each barrack specifically, because we have considered it more advisable to leave the question as to which arrangement to adopt, to the local officers, but we nevertheless are of opinion that night urinals are essential for barrack-rooms.

Or a moveable tub may be adopted on the principle shown in Plan XV.

At the new Pembroke barracks urinals have been placed in a projecting porch behind the barrack room, and completely cut off from the room by a separate ventilation; but they are of unsuitable construction and material. They were formed of soft porous stone; soon saturated with urine, which actually made its way through the wall to the outside. This experience affords practical illustration of the unsuitableness of this material for any purpose of sewerage, drainage, latrines, or urinals.

13.—Cleansing.

The barrack yards and premises are in most instances kept clean. But wherever we found the surface paving or guttering imperfect, there was imperfect cleansing more or less as a necessary result. It need scarcely be stated that in such a climate the greatest possible attention should be paid to these matters.

It is the practice in most barracks to collect the barrack refuse in ashpits, often in close confined positions, from which the matters are removed at short intervals by people who contract to do it. There are also stables; and it sometimes happens that while the stable manure is very properly and necessarily removed at once, the barrack refuse in the ashpit is left to accumulate.

Ashpits should not be permitted at any of the barracks. They should be cleansed, filled up a foot above the level, and the space flagged and drained, and iron boxes placed on the flags to receive the refuse. The boxes should be emptied every day into the cart, and no accumulation should be permitted.

The barrack rooms generally appeared to be clean, but there was nevertheless a peculiar odour in the rooms, which showed that the walls were saturated with the exhalations from the breath and bodies of the men. This condition of the walls of dwelling rooms has a well-known effect on the frequency with which fevers and other zymotic diseases occur. These diseases form a large item in the sickness and mortality of the garrison, and it would be highly advisable, as a preventive measure, to scrape the whole interior of the casemates, and all the barracks, at least once in every two years, and to wash the walls, ceilings or arches once in six months with quick-lime.

14.—Non-Commissioned Officers' Quarters.

These quarters are generally in casemates, similar to those used for soldiers' quarters. Occasionally, as at Fort St. Elmo, small rooms, some of them built against the rock, are set apart for the purpose, and wherever this is the case there are great complaints made by the inmates of closeness and ill-health. The accommodation consists usually of a single room, having from 1,500 to 2,000, 3,000, or 4,000 cubic feet of contents. The serjeants' rooms at Fort Verdala contain nearly 5,000 cubic feet, the space being the same as that allotted to 10 men in the adjoining barrack rooms.

Serjeants' bunks are in use in several barracks, as for instance in Lower St. Elmo, where there is a bunk without direct light or air in every room of the two inhabited floors of that unhealthy barrack. There are certain difficulties in the way of their removal out of the rooms, for indeed it would be impossible to provide other accommodation; but there is no reason why every bunk should not have a small window to admit light and air.

The ventilation of serjeants' rooms is generally of the same nature as that of the barracks, and should be improved on similar principles. All those built against the rock should be abandoned with as little delay as possible, and ventilated in the meantime.

15.—Married Quarters.

There are no specially built quarters for married soldiers. They are generally provided for in rooms not good enough for barrack rooms, or in unoccupied barrack rooms, or in the arches of counterforts or fortini, as is the case at Fort Ricasoli and in the Cotonera lines. There are also a few married people in wooden huts.

The accommodation is of a very inferior and uncomfortable kind. That provided in the fortini and counterforts has been obtained by simply constructing a wall across the arch, leaving space for a door and window. The arches generally are narrow and shallow, and the superficial area of the rooms so obtained is very small. Sometimes the space is added to by placing a floor above; but in this case it is necessary to leave a hole in the floor for the ladder of access, thereby rendering the floor too small for any purpose, and the place so inconvenient that these upper floors are hardly ever used.

We have pleasure in bearing testimony to the cleanliness and neatness of these small uncomfortable dwellings. The soldiers' wives evidently take a pride in making the very best of the accommodation, and much could be done to increase their comfort at a very small cost. To enlarge the accommodation we would recommend that in all cases where there are families two adjacent arches should be given over for a quarter, and a door made through the intervening pier, and that where floors have been introduced they be removed.

But it is absolutely essential that married soldiers' quarters should be built to supply the required proportion of accommodation of this class.

We have already described, and shown on Plan V., the general construction of married quarters for the Mediterranean stations. Fire-places may be omitted at Malta, but a cook-house, similar to the one on Plan V., should be provided in a convenient situation with several broad chimney recesses with raised platforms on which the women may cook.

It is unnecessary to make further provision, because the small Maltese fire-clay stove, which is universally used in Malta, and generally so by the soldiers' wives at the present time, affords sufficient means of cooking.

For each group of quarters an ablution room for men, and one for women and children, similar to Plan VIII., should be provided.

The best arrangement for these quarters for Malta is to place them in a row of the required number of stories in height. Each quarter should be entered from the open air, under a verandah or from a gallery. Sinks for refuse water, and water supply, should be placed in the building allotted for cooking, but should be kept quite away from the living rooms. Each gallery or floor of the living rooms should be supplied with an iron box for the reception of refuse, which should be carefully cleaned out every day.

16.—Guard Rooms and Prison Accommodation.

The guard rooms are, with few exceptions, by no means good. Like the barrack accommodation they are in casemates, as near the gates as possible, and, like the barrack rooms, they are generally deficient in light and ventilation, and in some instances very much overcrowded. The amount of space per man depends of course on the number of men on guard; but when there is a full guard there is overcrowding, except in one or two instances. The following table gives a general idea of the space per man allowed:—

Guard Rooms.	Cubic Contents in Feet.	Number of Men on Guard.	Cubic Feet per Man.
Upper St. Elmo	1,733	17	102
Lower St. Elmo	10,091	11	917
Marsamuscetto	6,588	12	549
St. James' Cavalier	1,776	10	177
Floriana	5,252	14	375
St. Peter's Lower Counterguard	9,461	4	2,365
Fort Tigne	1,862	7	266

This table shows considerable diversity of practice in allotting space in guard rooms, and we would recommend that, as a rule, this space should never be less than that allowed in barracks.

The cell accommodation is mostly of an unsuitable character. The cells are usually casemated, but in two or three instances they are wholly or partially hollowed out of the rock, and are damp in consequence.

Their cubic capacity varies considerably. Sometimes it is apparently more than is required for health; as, for example, at Upper St. Elmo, where the cells have from 2,400 to 3,700 cubic feet; but again, these cells are dark, more or less damp, and not fit for anything except mere temporary occupation. They are not places in which men should undergo sentences. On the other hand, the cells in Lower St. Elmo have a capacity of only 574 cubic feet, or about one half what they ought to have, even if they were good. The cells at Floriana barracks have from 1,500 to 2,000 cubic feet capacity; while the cells at St. Francis barrack, close at hand, have a capacity of only 490 cubic feet, and are badly ventilated besides. The cells at Verdala barrack have less than 800 cubic feet, and those at Fort Manoel give from 550 to 759 cubic feet for each prisoner. These amounts are too small for health in such a climate. There are certain associated cells at Upper St. Elmo, which have to be used for men sent from the garrison military prison, where there is not sufficient accommodation for the ordinary prisoners. This necessary practice of course renders prison discipline on men undergoing sentences almost impossible.

Taken as a whole, the prison accommodation is deficient. The garrison prison, elsewhere described, affords a very inadequate amount of space, as it only contains 33 cells for a garrison of 6,000 men: the usual allowance being from 1 to 1½ per cent. of the force. It is badly placed, and not healthy, and we are strongly of opinion that a better prison, with sufficient accommodation for the wants of an increasing garrison, should be built on a more healthy site. One of the bastions on the Cotonera lines would afford a convenient position.

For guard-rooms, the arrangement shown on Plan VI. will be found convenient, but the details will of course vary with the extent of accommodation required.

17.—MEANS OF INSTRUCTION AND RECREATION.

The means of instruction and recreation at present existing are as follow:—

1. There are a few ball courts.

2. There are schools, usually held in casemated rooms, some of which are not very suitable on account of being too dark and not very healthy. In one or two instances the schools are held in the old catholic chapels of the forts, as at Fort Manoel, where the accommodation is tolerably good. Besides these, two excellent chapel schools have been recently built. We found all the schools deficient in ventilation, and those in casemates deficient in light. The chapel schools, from their construction, can be best ventilated through the ridge and at the eaves. The casemated schools should be ventilated and better lighted, on the same principles as the barrack rooms.

3. Most barracks have a library and reading room, also in casemates. They are lighted at night by oil lamps. During the day there is not light enough, on account of the construction. All require more light and air.

4. There are sometimes garrison races, leaping, quoit-playing, skittle and ball playing, cricketing, boating, &c.

There are no day-rooms, no place in fact to sit in, except the uncomfortable casemates; or, as in the case of Lower St. Elmo, the recreation rooms are in the gloomy, unwholesome, ground floor of the barracks.

There are no cricket or skittle grounds, no workshops, and no gymnasia. Temporary theatres are sometimes erected by the soldiers. There are no soldiers' gardens, but with reference to them, it has been stated to us that the French, during the blockade of the fortress, kept themselves from scurvy by cultivating vegetables in the ditches; showing that gardens can be cultivated.*

The means of recreation are very deficient. There is not sufficient shade, and the men are confined to their barracks during the heat of the day in summer, just at the time when fevers are most prevalent throughout the garrison and among the civil population, and when it is of most importance for the men to have sufficient exercise and fresh air to breathe.

We consider it a matter of urgent necessity that each barrack should have a day room and reading room constructed on the principles laid down in the report on soldiers' day rooms. The rooms should be light and airy and well supplied with comfortable benches with sloped backs arranged along the walls, arm-chairs, and broad solid tables. There should be a small bar for tea and coffee, bread, butter, &c. There should be gymnasia in positions convenient to the principal barracks in which the men could be properly trained. Gymnastics should be made a parade.

18.—RECAPITULATION.

Before proceeding to discuss the hospital question, we shall briefly recapitulate the results of our inquiry as regards the barracks.

1. The most important diseases from which the troops suffer in Malta are fevers, chiefly of the continued and typhoid types, and diseases of the chest, especially tubercular consumption.

2. Except the debilitating effect due to heat, there is nothing in the climate or topography to give rise to these diseases. But there is enough in the present condition of the barrack and hospital accommodation to account for their prevalence.

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* We are glad to learn that since we were at Malta the Governor has set apart two ditches in which to form soldiers' gardens, one near Floriana barracks, the other near Lascaris.

3. Although great improvements have been effected of late years in the sanitary condition of the towns, there is sufficient in the present state of the drainage and in the outlets to occasion impurity of the air in the neighbourhood of some of the barracks.

4. With the exception of Lower St. Elmo, all the barracks are at a sufficient elevation above the sea to ensure good drainage; but the local position of several of them, as regards the surrounding levels, is prejudicial to health, especially where rooms are built against the rock.

5. The local position of nearly all the barracks is very disadvantageous to free external ventilation, from the proximity of high walls or other buildings.

6. The barracks, except the new Pembroke barracks, are all casemates, and all are built of soft sandstone, which absorbs a large quantity of moisture, and, under certain circumstances, gives rise to dampness of the rooms.

7. With few exceptions, the barrack-rooms are deficient in light and ventilation, and many of the rooms are overcrowded, especially as regards the superficial area per bed.

8. The barracks are drained, but the drainage is not of a healthy kind on account of deficient water supply, the disproportionate dimensions of the sewers, and the bad porous material out of which the sewers have been formed.

9. The latrines are constructed of a bad material, and give rise to nuisance and impurity of the air around the barracks. They have generally no seats nor divisions, no doors, no water-supply, except what is carried by hand; and they are generally deficient in light and ventilation. The urinals are bad as regards both construction and material.

10. There are ashpits in close confined situations injurious to the purity of the air.

11. There is no water laid on for any purpose. All water for ablution, cooking, washing, drinking, and for drainage purposes, has to be raised and carried by hand labour. Drinking water is not filtered.

12. The means of personal cleanliness are very deficient.

13. The cook-houses are, with few exceptions, deficient in light and ventilation, and the cooking apparatus is of an inferior kind.

14. There are no proper means of washing soldiers' linen.

15. The married quarters are not sufficient for the requirements of the garrison.

16. Many of the guard rooms are of an inferior description, overcrowded, and deficient in ventilation. The prison and cell accommodation is deficient.

17. There are not sufficient means of recreation.

Considered as a whole, excepting the new Pembroke barrack, there are no good barracks in Malta. There are several, such as Lower St. Elmo, Strada Torre, St. Elena gate, Isola gate, and the lower floor of St. Peter's Lower Counterguard, which are not suited for human habitation, except temporarily; and we would strongly recommend that this view of the subject be taken, and as few men as possible barracked in the worst class of buildings. It is no doubt possible to build comparatively healthy casemates as part of the defences; but this has certainly not been done in Malta, in the majority of the barracks, which, to judge from their position and construction, as indeed we know from other sources, were never intended for occupation in the manner in which they are now occupied. Better accommodation, and on healthier ground, is what is required to preserve the health both of officers and men, and Pembroke barracks afford an excellent precedent, although the accommodation there is not all that could be desired in a sanitary point of view.

We have already stated generally the nature of the improvements in drainage, water-supply, ventilation, and diminution of overcrowding, latrines, ablution accommodation, &c., which we recommend to be carried out. These will materially lessen the existing evils and lead to improved health; but improved barrack accommodation is more required in Malta generally than at any home station.

19.—Sanitary Condition of Hospitals.

The hospital accommodation for this large fortress consists of four separate hospitals containing 619 beds, and a sanitarium with 88 beds. In Valetta there is one general, or rather partially consolidated hospital, close to fort St. Elmo, and occupying one of the worst sites in the town. It is mostly cut off from the influence of healthy winds, and exposed chiefly to the sirocco. The outlets of three town sewers are close to it; one of the sewers passes under its centre, and sewer gases make their way freely into different parts of the building. Being at a low level, comparatively, and at the bottom of a slope, the drainage and moisture of the sandstone rock gravitate towards the building, and the air in and about the wards is always more or less impure.

There are two hospitals at Vittoriosa; one of these, called Vittoriosa hospital, is situated on an elevated site, surrounded by a densely peopled neighbourhood. The other consists of two hired houses adjoining each other in a close narrow street in the same neighbourhood, at a much lower level, and near the unhealthy dockyard creek.

Since the establishment of the camp in St. George's bay, another hospital has been opened at Spinola palace at the top of St Julian's bay. It has one or two good rooms, and the situation is healthy. The arrangement of parts is, of course, that usually adopted in private houses, and is not well adapted for a permanent hospital.

The construction of all the hospitals is bad. The General hospital, Valetta, although it has spacious and lofty wards, is gloomy and badly ventilated. It has small narrow windows close to the eaves, through which it is hardly possible for the sick to see the sky. It is deficient in all structural arrangements for health and administration, and they cannot be supplied without a large outlay. Healthy winds can never, from its position, sweep through the building. John Howard, who visited this hospital in 1786, states that "slow hospital fever" prevailed in it, partly due, no doubt, to the wretched administration of the period. Since it came into British possession it has been a continual source of complaint for many years on the part of army medical officers; and, although it can be improved in some respects, it will always be more costly for sick, than would be the cost of a new building in a better position.

The upper wards of Vittoriosa hospital have a better exposure for health than those of Valetta hospital, which to a certain extent neutralizes the radical defects of their construction. But the lower floor wards, which are constructed like the cells of a prison, and also the wards in the cavalier, with their immensely thick walls and narrow loopholes for windows, are quite unfit for sick people. The whole establishment, however suitable for its original purpose as an armoury, is most unsuitable for a hospital.

The amount of space and superficial area allotted per bed in these hospitals varies in a very remarkable degree. This is shown in table, Appendix No. 24, of which the following is an abstract.

CUBIC FEET.

400 to 500	500 to 600	700 to 800	800 to 900	900 to 1,000	1,000 to 1,100	1,100 to 1,200	1,200 to 1,300	1,400 to 1,500	1,500 to 1,600	1,600 to 1,800	1,800 to 2,000	2,000 to 3,000	3,000 to 4,000
No. of Beds.	No. of Beds.	No. of Beds.	No. of Beds.	No. of Beds.	No. of Beds.	No. of Beds.	No. of Beds.	No. of Beds.	No. of Beds.	No. of Beds.	No. of Beds.	No. of Beds.	No. of Beds.
4	26	45	22	77	42	90	6	9	47	31	10	114	96

SUPERFICIAL FEET.

30 to 40	40 to 60	60 to 80	80 to 100	100 to 120	Above 120
No. of Beds.	No. of Beds.	No. of Beds.	No. of Beds.	No. of Beds.	No. of Beds.
41	39	203	198	130	8

This table shows that half the whole number of beds have less cubic space than is required for a warm climate (1,500 cubic feet), and very nearly half have no more space than is required in cold climates (1,200 cubic feet) as laid down by the Royal Commission on the sanitary state of the army, and embodied in the new medical regulations. More than half the beds have a less superficial area than is necessary for health, considering the local position and construction of the hospitals. Hence the element of overcrowding exists in some part of all the hospitals.

The proper space for a sick man in such a climate as that of Malta is 1,500 cubic, and 100 superficial feet.

Ventilation.—The ventilation of the hospitals in Valetta and Vittoriosa is as defective as it is in most of the barracks, and should be improved on the same general principles as those laid down for barracks. The ventilation of Spinola hospital is better from its open position.

Drainage.—The drainage of the Valetta and Vittoriosa hospitals is bad, and gives rise at times to serious nuisance. It requires to be examined and improved by laying down pipe drains, and by filling up the present large sewers.

The town sewers, which pass close to and under the General hospital, require relaying; and their outlets should be carried by iron pipes into deep water in the manner already mentioned.

Water-supply.—Water is obtained from rain-water tanks, and partly from the aqueduct. It is sufficient in quantity and is said to be good in quality, but it is not laid on as it ought to be for all hospital purposes.

Ablution and Bathing Accommodation.—This was undergoing improvement at the General hospital at the time of our inspection; but after the additional baths are provided, they will be dark and damp, besides being too far removed from a considerable part of the patients. There is no ablution or bathing accommodation connected with the wards of any of the hospitals.

There ought to be small rooms close to the wards, having fixed wash-hand basins, with baths, and hot and cold water laid on. It is only by holding out such facilities and inducements to cleanliness that sick men can be kept clean.

Cook-houses.—The cooking arrangements are, on the whole, sufficient, but the accommodation generally is not what it ought to be. The cook-houses are on the ground floor, and are darker than is consistent with good management or cleanliness. They partake in short, of the defects of the hospitals.

Waterclosets.—There are none. At some distance from the sick wards, and on different floors, as regards some wards, there are the usually offensive Maltese latrines of porous stone, such as exist in the barracks. The whole of the existing system of latrines should be removed. Proper waterclosets are required in proximity to the sick wards in small rooms separately lighted and ventilated, and divided from the wards by ventilated lobbies.

Latrines required away from the wards for convalescents or attendants should be of Macfarlane's or Jennings' construction.

Serjeants' and Orderlies' Rooms.—None of the wards have any rooms or sculleries attached to them. There is no possibility of keeping a due oversight of the sick, or of the serjeant or orderly being always at hand night and day, unless he sleeps in the ward. This practice of orderlies sleeping among sick is quite inadmissible, although it is carried out from sheer necessity. Generally, the hospital serjeant sleeps quite away from the proper sphere of his duties.

Exercising Ground for Convalescents.—Spinola hospital is the only one where convalescents can get proper exercise in the open air. The only place for the purpose at the General hospital is a sunk court, where the air is stagnant and more or less foul from the bad state of the drainage. At Vittoriosa there is no place for exercising convalescents, except the flat roof of the hospital; a very dangerous place on account of there being no parapet.

It is quite unnecessary to say more to prove the unsatisfactory state of the hospitals within the garrison. Men at all seriously ill linger long in hospital, and the experience of this result, together with representations made on the subject, have led to the establishment of the sanitarium at Citta Vecchia, which is neither more nor less than a defensive measure against the hospitals. Men are taken slightly ill in barracks, they are sent to hospital, where they get worse, and then they are sent to Citta Vecchia, where they improve. Spinola hospital was established partly as a sanitarium, and thus two additional establishments have been called into existence, and now there are five hospitals doing the work for the sick within the lines which could be done by one good general hospital erected in an airy, healthy position, or at most by one general hospital and a small hospital for the Cotonera side.

Spinola hospital, it is true, was partly intended for receiving sick from Pembroke barracks; but while we were in it the cases had, with very few exceptions, been received from Valetta. It was perfectly right that such should be the case, for we feel assured that no medical officer would willingly attempt to treat sick in the hospitals within the lines if he had the opportunity of sending them away.

Even in the Naval hospital, which is in every respect so greatly superior to the military hospitals, we were told of cases, especially of fever, which lingered there, but which would have recovered rapidly if sent to Citta Vecchia.

With the evidence before us we cannot do otherwise than express a very unfavourable opinion of the present hospitals. The Vittoriosa hospital might be extended and improved to render it sufficient for temporary use on the Cotonera side, if it could be done at a less cost than providing a new hospital there, but it would never be a good hospital on account of radical defects in its structure. It might, however, be made large enough to accommodate the sick in the present hired hospital, which should be given up. As regards the General hospital at Valetta, it will never be other than a bad hospital whatever is done with it. No doubt the windows can be enlarged, the ventilation improved, room for administration, baths, lavatories, and water-closets can be constructed for each ward, and all buildings thrown down which interfere with the external ventilation, but the cost would be very considerable and incommensurate with the advantages, for the primary evil of a bad local position would remain and cases would still require to be sent to the sanitaria for recovery. With this general remark we arrive at the most important point of the whole hospital inquiry—viz., considering all the difficulties of the case, what is the best course to take?

Three methods of dealing with this question have been brought before us.

First. It has been proposed to make a few improvements in the ventilation and drainage of the existing hospitals, adding such parts as may be required, and removing useless buildings, and to continue the present hospitals.

We have said enough to dispose of this alternative already. Only we are of opinion that, as whatever steps may be taken for providing suitable hospital accommodation will require much time, these improvements should be carried out, because the present hospitals must be used in the interval.

Secondly. It was proposed two or three years ago at Malta, to build a general hospital for 300 beds; a site was examined, and plans were sent home for approval. Neither site nor plan were considered sufficiently good. A new site was pointed out on St. Michael's bastion, 169 feet above the quarantine harbour, and freely exposed to all the cool and healthy winds.

Plans were prepared for erecting a general hospital containing every modern improvement by direction of the late Lord Herbert, and approved of by him and by the Barrack and Hospital Improvement Commission of which he was then president; but after everything was ready for proceeding with them, the military authorities on the spot considered that it would be more advantageous to the public service to build new barracks at the rifle practice ground, St. George's Bay. The sick have suffered from this decision, but on the other hand the whole garrison, at the rate of 1,000 men at a time, have now the advantage of being withdrawn from unhealthy casemates to one of the healthiest spots on the island, and their average standard of health will be raised by the change.

Another form of the proposal was to erect one general hospital in as central a position and on as healthy a site as could be obtained outside the lines, to consolidate the entire hospital administration, and to connect the hospital with all the barracks by a service of ambulances.

Third. The sanitarium at Citta Vecchia has been so successful that the Governor is of opinion that the accommodation should be extended to the dimensions of a general hospital for the garrison, the sick to be brought in ambulances from all the barracks, and the medical officers by suitable means of conveyance.

It will be necessary for us to examine this proposal in detail, referring for a description of the building to our report on it.

The position of the Grand Master's "palace of justice," now occupied as a sanitarium, is a very fine and commanding one, about 600 feet above the level of the sea, and exposed to every breath of wind. The situation is much cooler and far more healthy than that at Valetta, and so far as experience has gone, cases of disease, especially fevers, recover well at Citta Vecchia. Convalescences are also rapid, but the climate is believed to be not so well suited for chest diseases brought from the hot close districts about the garrison.

The distance of the sanitarium from the most remote barracks is from 6½ to 7½ miles. The main roads are good, and on the whole the means of communication are sufficient. There appears to have been no practical difficulty in removing the sick, for while we were at Malta a proposal was under consideration for occupying the sanitarium by fever cases from all parts of the garrison. This is a point of much importance in the discussion, because it disposes of the question of the possibility of removing convalescent cases, at least, in the affirmative, and proves that there is great benefit in sending these cases out of the garrison, even to such a distance; but the space within the palace is only a small part of what would be required if it were to be converted into a general hospital for the whole garrison.

The present accommodation in the building consists of 18 rooms, containing 88 beds, with from 1,625 to 1,800, 2,500, up to nearly 3,500 cubic feet per bed. The rooms on the principal floor are very lofty, and vary from 21 to 32 feet in height. The floor space per bed is generally above 100 superficial feet, and is ample for every purpose. This hospital indeed affords the first instance we have met with in which the great importance of the element of superficial area has been recognized. We have no doubt whatever that the place has been of great use to the sick, and if all the sick are to have the benefit of such a change, we must inquire what the capabilities of the building are for being extended to receive the number of beds required for the force.

The present hospitals contain 619 beds in addition to the 88 at Citta Vecchia. We do not consider this latter number admits of being materially increased in the present rooms. It is true that 100 superficial feet would be quite enough for each bed, but on the other hand some of the small low roofed upper-floor rooms are not very good and should not be used under ordinary circumstances.

If we assume the capacity of the building at 100 beds, it would be necessary to extend it to afford space for 600 additional beds to make up the present hospital accommodation. But it is very probable that the beds *constantly occupied* would be very much reduced in number if all the sick were taken to Citta Vecchia, on account of more rapid recoveries. It is probable that 500 beds in all would be sufficient for every purpose, and hence an addition to the present building, capable of containing 400 beds at 1,500 cubic feet and 100 superficial feet per bed would meet the requirements of the case. 40,000 superficial feet of flooring with wards 15 feet high, besides the area required for serjeants' and orderlies' rooms, sculleries, baths, and water-closets, would have to be found in the neighbourhood of the present building. It is quite certain that no such amount of space could be obtained by any re-arrangement of the interior of the palace. Two or, at most, three good wards could be built above the present wards, but the whole of the space beyond this would have to be found by adapting other houses in the vicinity, or by erecting additions. There is a long narrow building, the front of which is in the same line as the front of the palace, but it is cut up into a number of small badly lighted rooms, which mostly look into close courts or narrow streets. This building in its present condition is quite unsuited for any hospital purpose, and any wards formed out of it would have to be built on its walls. By doing this perhaps two floors of wards might be obtained. But the area for wards, including that of the small piazza between the hospital and the building in question would fall far short of what is required; there would still be a deficiency of space for above 200 beds, on the most favourable supposition. A bastion adjoins one end of the palace on which an additional ward might be erected, but to do this would be to deprive convalescents of their only exercising ground.

We have not adverted to the cost of these alterations, because, in truth, the changes required simply amount to building a hospital for the additional number of beds on a site of a very irregular and circumscribed character, 7 miles from Valetta, and half the buildings when completed would not possess that simplicity of construction so desirable in a hospital.

We are of opinion that the present buildings at Citta Vecchia are very well adapted for the recovery of convalescent cases, which are more easily removed to a distance of 7 miles than are sick; besides requiring less constant care and attention; but considering the distance, and more particularly the great difficulty and cost, if not the impossibility of extending the buildings at Citta Vecchia in a suitable manner, we cannot recommend a general hospital for the whole garrison to be provided there.

After a careful consideration of the whole hospital question we have arrived at the following conclusions:—

1. That it is absolutely necessary to build a new hospital at Valetta for the sick of that part of the garrison, in place of the present very objectionable structure. That there is sufficient space on St. Michael's bastion, the best and most healthy site within the garrison, on which to erect a hospital for not more than 300 beds, with every sanitary improvement. We append Plans and a description of the proposed hospital; and we beg to recommend that it be built. (Plans XXVIII., XXIX., XXX., and XXXI.)

2. That the present hospital at Vittoriosa is not adapted for sick; that the hired hospital is an altogether objectionable building for its purpose, and we recommend that instead of these a new hospital for 136 beds be built on an enclosed space on the new fort, Cotonera, on Plans XXVIII. and XXXII., as an auxiliary to the General hospital, Valetta.

3. That Spinola hospital be in the meantime retained for the use of sick from Pembroke barracks, St. George's Bay, and that the sanitarium at Citta Vecchia be also retained for convalescent cases, at least for the present.

In discussing the question of additional barrack accommodation we have referred to the amount of space which would be available in the present hospitals if the sick were removed out of them. By converting the wards into good barrack rooms the hospital improvements we have recommended might be made subservient to the extension of barrack accommodation. The General Hospital, Valetta, and Vittoriosa hospital, although by no means good enough for sick men, could nevertheless be converted into much better barrack accommodation, at a moderate outlay, than that afforded by the casemates. Both hospitals are substantial buildings, and one of them, the General Hospital, contains a very large amount of cubic space quite useless at present, but which could be rendered available by dividing the larger wards into two floors, and introducing the necessary doors and windows. Five of the larger wards are 30½ feet high, and by merely throwing floors across at mid-height there would be 620,582 cubic feet, and above 40,500 square feet of floor surface available for barrack rooms, with a height of about 15 feet per room.

Another room, 25 feet 8 inches high, might possibly be divided by a floor into two rooms, each 12 feet 6 inches high, and if this were done 53,309 cubic feet and 4,148 square feet of barrack-room space would be obtained. Another room, if similarly divided, would afford 67,200 cubic feet and 5,712 square feet in rooms about 11½ feet high.

There are altogether 20 wards in the hospital, many of them lofty and of large size, but none are lofty enough to admit of division into two floors except those already mentioned. If all the rooms were improved, properly subdivided, and rendered fit for use; if they had sufficient window and door space opening from external galleries; together with abundant means of ventilation, these hospital buildings might very well accommodate from 800 to 900 men in a situation where additional barrack room is very much required for defence purposes, and where there is no place to build it.

Vittoriosa hospital would accommodate about 100 men on the upper floor. But none of the other wards are fit for anything else but store rooms.

In round numbers, barrack accommodation for 1,000 men might be obtained by building a hospital at Valetta for 300 beds, and another at Vittoriosa for 136 beds, and by incurring the moderate additional cost of adapting the present hospital buildings for barracks.

20.—Burial Grounds.

There are two military burial grounds belonging to the garrison. One of these is situated on a steep slope overlooking the quarantine harbour, immediately outside the works of Valetta. The other is close to Verdala barracks, on the Cotonera side. They are each about half an hour's marching distance from the hospitals. The subsoil is rock, and there is no surface soil except what is produced by pulverizing the rock. The Valetta ground has been buried over more than once, and is in a very unsatisfactory state on account of the extension of the defences, by which the surface has been partly covered with rubbish. It appears to be saturated with human remains, as it becomes occasionally offensive in hot weather, and has to be partly covered with earth. A new burial ground is required, and it should be placed outside the lines, as there is no available space within. The civil government contemplate the laying out of a cemetery on a sufficient scale at a short distance from Valetta; and possibly some adjoining ground might be found available for a military cemetery, without offending the religious prejudices of the native population. About an acre and a half to two acres would afford the required area.

In the preceding pages we have stated the general results of our inspection and inquiries, and we now proceed to give as briefly as possible the more important sanitary points bearing on the health of the troops in each barrack and hospital separately.

SECTION III.—DETAILED REPORTS ON BARRACKS AND HOSPITALS.

1.—Fort St. Elmo.

This is a large fort, situated at the northern point of the town of Valetta where the land projects into the open sea, which encircles the fort on three out of its four sides, and ensures an ample external ventilation for the position. The site varies in elevation above the sea-level, following in this respect the natural configuration of the ground. It is divided into two parts, called Upper and Lower St. Elmo, differing considerably in elevation and also in the sanitary condition of the barracks in each division. Upper St. Elmo occupies comparatively high ground, and rises considerably above Lower St. Elmo, the occupied area of which latter is very little raised above the water level.

Upper St. Elmo.—This large work consists of salient bastions and curtains, partly formed out of the solid rock.

The area within the crest of the parapet is about 3,120 square yards. The surface soil of the barrack square is sandy and the subsoil rock. The parapets and bastions rise considerably above the level of the principal barracks, and at the northern angle of the fort a lofty cavalier overtops all the buildings and cuts off to a considerable extent the cool winds from that quarter. This cavalier and the ramparts enclose within them an irregular area of ground approaching to a square form, about 250 feet across, along the sides of which are built the brigade offices, officers' quarters, mess establishment, and part of the soldiers' barracks, while the principal portion of the latter class of accommodation, amounting to 20 rooms, occupies a long building crossing the area from east to west, and forming one side of the barrack square.

Behind and to the north of this building, and separated from it by an intervening space of from 30 to 50 feet in width, are two blocks of building containing the ablution rooms, women's wash-houses, cook-houses, and engineer stores. At the east end of one of these blocks nearest the sea are placed the privies and an ashpit.

The other sides of the square are formed by soldiers' rooms on the ground floor, with the brigade offices and officers' quarters on the floors above, and by the mess establishment.

At a higher level, and immediately to the south of the officers' quarters, are two long ranges of one-story rooms partly used as married quarters, and in the southern bastions are two blocks containing six soldiers' rooms in each. There is another row of barrack rooms along the southern side of the top of the cavalier; they have small courts in front of them, and are appropriated as serjeants' quarters.

The external ventilation of these various groups of rooms differs according to their degree of exposure to winds and also to the extent of their isolation from adjacent walls. One entire range of rooms on the south side of the square, Nos. 63 to 69 inclusive, abuts directly on the rock; they are damp and have no through draught. The present occupants, who are married people, suffer from unusual sickness on account of the twofold defect of dampness and want of fresh air. Rooms 50, 51, and 52 are also damp on account of one side serving as a revetment to the terreplein of the battery.

The other rooms are all more or less isolated; the principal barrack blocks are two floors in height, but most of the rooms appropriated as married and serjeants' quarters are only of one floor.

All the rooms are built of soft Maltese stone, and have arched verandahs along one side above and below. The upper verandahs are reached by outside stairs, and afford the means of entrance to the upper floor of rooms. Several rooms communicate with each other by doors in the division walls. The floors are constructed of hard and of soft stone except in one case where cement has been used. The lower floors are not raised above the ground, but are generally laid on earth or rubbish, in the upper rooms the stone floors are laid on joists or arches. There are no fireplaces in the barrack rooms.

The following table gives the statistics of the barrack accommodation :—

Date of Construction : the time of the Knights.
Total Number of Rooms, 73.
Total Regulation Number of Men, 226.

Barrack Rooms.	Regulation Number of Men in each Room.	Dimensions of Rooms.			Cubic Feet per Man.	Superficial Area in Ft. per Man of Floor Space.	Windows.		
		Length.	Breadth.	Height.			No.	Height.	Width.
No.		Ft. in.	Ft. in.	Ft. in.				Ft. in.	Ft. in.
1	8	24 5	14 8	5 4 7 2	493	44¾	1 1 2	3 4 2 7 3 9	2 4 1 7 2 2
2	8	24 5	14 8	5 4 7 2	493	44¾	1 1 2	3 4 2 7 3 9	2 4 1 7 2 2
3	8	24 5	14 7	5 4 7 2	491	44½	1 1 2	3 4 2 7 3 9	2 4 1 7 2 2
4	8	24 5	14 7	5 4 7 2	491	44½	1 1 2	3 4 2 7 3 9	2 4 1 7 2 2
5	8	24 5	14 8	5 4 7 2	493	44¾	1 1 2	3 4 2 7 3 9	2 4 1 7 2 2
6	School	24 5	14 8	5 4 7 2	- -	- -	1 1 2	3 4 2 7 3 9	2 4 1 7 2 2

Barrack Rooms.	Regulation Number of Men in each Room.	Dimensions of Rooms.			Cubic Feet per Man.	Superficial Area in Ft. per Man of Floor Space.	Windows.		
		Length.	Breadth.	Height.			No.	Height.	Width.
No.		Ft. in.	Ft. in.	Ft. in.				Ft. in.	Ft. in.
7	8	24 5	14 8	5 4 7 1	480	44¾	1 1 2	3 4 2 7 3 9	2 4 1 7 2 2
8	Library	24 5	14 8	5 4 7 2	- -	- -	1 1 2	3 4 2 7 3 9	2 4 1 7 2 2
9	8	24 5	14 8	5 4 7 2	493	44¾	1 1 2	3 4 2 7 3 9	2 4 1 7 2 2
10	Serjeants' Mess	24 5	14 8	5 4 7 2	- -	- -	1 1 2	3 4 2 7 3 9	2 4 1 7 2 2
11	11	25 8	16 0	14 4	534	37¼	1 1 2	3 4 2 7 3 9	2 4 1 7 2 2
12	11	25 8	16 2	14 4	540	37½	1 1 2	3 4 2 7 3 9	2 4 1 7 2 2
13	11	25 8	16 1	14 6	544	37½	1 1 2	3 4 2 7 3 9	2 4 2 7 2 2
14	11	25 8	16 0	14 4	535	37¼	1 1 2	3 4 2 7 3 9	2 4 2 7 2 2
15	11	25 8	16 2	14 2	534	37½	1 1 2	3 4 2 7 3 9	2 4 1 7 2 2
16	11	25 8	16 0	14 4	535	37¼	1 1 2	3 4 2 7 3 9	2 4 1 7 2 2
17	11	25 8	16 0	14 4	535	37¼	1 1 2	3 4 2 7 3 9	2 4 1 7 2 2
18	11	25 8	16 0	14 4	540	37½	1 1 2	3 4 2 7 3 9	2 4 1 7 2 2
19	11	25 8	16 3	14 6	549	38	1 1 2	3 4 2 7 3 9	2 4 1 7 2 2
20	11	25 8	16 3	14 8	556	38	– – 2	2 0 2 7 3 9	1 9 1 7 2 2
21	1	17 4	10 9	11 3	2,096	186	1 1	3 0 2 10	2 3 2 7
22	1	17 5	10 9	11 3	2,107	187	1 1	3 0 2 10	2 3 2 7
23	1	17 5	10 9	11 3	2,107	187	1 1	3 0 2 10	2 3 2 7
24	1	17 6	10 9	11 4	2,132	188	1 1	3 0 2 10	2 3 2 7
25	1	17 4	10 9	11 4	2,112	186	1 1	3 0 2 10	2 3 2 7
26	1	17 4	10 9	11 4	2,112	186	1 1	3 0 3 6	2 3 2 6
27	6	17 6	14 6	13 1	553	42	1 1	3 0 3 6	2 3 2 6
28	6	17 6	14 3	13 1	543	41½	1 1	3 0 3 6	2 3 2 6
29	Tailor's Shop	17 6	17 6	13 0	- -	- -	1 1	3 0 3 6	2 3 2 6
30		17 6	17 6	13 0	- -	- -	1 1	3 0 3 6	2 3 2 6
31		17 5	14 2	13 0	- -	- -	1 1	3 0 3 6	2 3 2 6
32	6	17 6	14 2	13 0	537	41	1 1	3 0 3 2	2 3 2 6
33	6	17 7	14 1	13 0	537	41	1 1	3 0 3 2	2 3 2 6
34	6	17 7	14 2	13 0	538	41⅔	1 2 1	3 0 3 9 3 6	2 3 2 2 2 6
35	5	17 5	11 11	12 5	515	41½	1 1	2 10 3 6	2 3 2 6

Barrack Rooms.	Regulation Number of Men in each Room.	Dimensions of Rooms.			Cubic Feet per Man.	Superficial Area in Ft. per Man of Floor Space.	Windows.		
		Length.	Breadth.	Height.			No.	Height.	Width.
No.		Ft. in.	Ft. in.	Ft. in.				Ft. in.	Ft. in.
36	5	17 6	12 0	12 8	532	42	1 1	2 10 3 6	2 3 2 6
37	5	17 5	12 0	13 0	543	41¾	1 1	2 10 3 6	2 3 2 6
38	5	17 5	12 0	13 0	543	41¾	1 1	2 10 3 6	2 3 2 6
39	5	17 6	12 0	13 2	553	41¾	1 1	2 10 3 6	2 3 2 6
40	5	17 6	12 4	13 2	568	43	1 1 1	2 10 2 8 3 6	2 3 4 3 2 6
41	Officers' Quarters	20 0	14 0	14 0	- -	- -	1 1	5 6 2 8	3 6 3 4
42		20 0	14 0	14 0	- -	- -	1 1	2 9 2 8	2 2 3 4
43	1	20 0	14 0	14 0	3,920	280	1 1	2 9 2 8	2 2 5 4
44	1	20 8	14 3	14 1	4,147	294	1 1	2 9 2 8	2 2 3 4
45	1	20 8	14 1	14 1	4,099	291	1 1	2 9 2 8	2 2 3 4
46	1	20 8	14 9	14 2	4,320	305	1 1	5 0 2 8	2 2 3 4
47	1	20 8	14 3	14 4	4,221	294	1 1	2 9 2 8	2 2 3 4
48	1	20 7	14 2	14 3	4,158	292	1 1	4 9 3 2	2 2 2 6
49	School	12 2	8 2	13 9	- -	- -	1	2 6	3 2
50	Carpenter's Shop	17 3	12 4	13 9	- -	- -	1 1	3 4 2 6	2 8 3 2*
51	Shoemaker's Shop	21 7	12 4	13 6	- -	- -	1 2	2 7 3 8	2 7 2 3
52		13 4	12 4	13 6	- -	- -	1	3 9	2 3
53	1	18 3	12 8	9 4	2,157	231	1 1 1	2 6 2 9 2 6	1 10 2 9 2 6
54	1	14 6	13 0	10 0	1,885	188	1	2 6	1 7
55	1	14 6	12 2	9 6	1,676	176	1	2 7	1 8
56	Lighthouse-man	14 6	12 0	10 2	- -	- -	1	2 7	1 8
57	1	14 6	12 0	9 3	1,609	174	1	2 7	1 7
58	1	14 0	10 7	8 8	1,284	148	1	2 7	1 7
59	Warrant Officer	14 4	12 4	9 5	1,664	176	1	2 8	2 0
60	1	14 4	12 8	9 5	1,720	181	1	2 4	1 10
61	1	14 4	12 5	9 5	1,676	178	1	2 9	1 10
62	1	14 4	12 5	9 5	1,676	178	1	2 9	1 10
63	1	14 6	13 10	11 9	2,356	200	1	2 9	2 6
64	1	14 6	13 10	11 9	2,356	200	1	2 9	2 6
65	1	14 6	13 10	11 9	2,356	200	1	2 9	2 6
66	1	14 6	13 10	11 9	2,356	200	1	2 9	2 6
67	1	14 6	13 10	11 9	2,356	200	1	2 9	2 6
68	1	14 6	14 3	11 9	2,367	207	1	2 9	2 6
69	1	13 10	16 4	11 7	2,560	226	1 1	2 9 1 0	2 6 3 0
70	Quartermaster's Store.	21 3	17 0	10 4	- -	- -	1 1	3 9 3 9	2 6 3 0
71		19 3	15 5	11 3	- -	- -	1 1	3 5 3 9	2 9 3 0
72		19 3	14 0	11 4	- -	- -	1	3 9	2 3
73	Serjeants' Mess and Kitchen.	17 3	10 8	11 2	- -	- -	1	3 6	2 0†
Guard Room	17	21 4	9 9	8 4	102	12	1	3 6	2 6‡
Prison Cells	1	20 4	12 6	9 6	2,414	254	—	—	—
	1	20 6	12 6	9 6	2,434	256	—	—	—
	1	22 3	10 8	5 0 12 2	3,737	237	—	—	—

* Supports to roof.

† Small supports to roofs.

‡ Part of the guard remain in the covered passage.

Overcrowding.—Considering the local climate of Malta, these barrack rooms are unquestionably overcrowded. The table shows that the cubic space per man varies from 480 to 550 feet; and that the superficial area, which is of still greater importance, varies from 37½ to 51 square feet per man. The largest of these quantities is about a third less than should be allowed as a general rule, but considering the elevated and healthy position of the barracks, they would accommodate the following numbers:

The rooms Nos. 1 to 10 should have six men instead of eight per room.

Nos. 11 to 20 should have each nine men instead of 11.

Nos. 27 to 34 should have their inmates reduced from six to five per room.

And Nos. 35 to 40 should have each four men instead of five.

The accommodation would hence be as follows:—

Number of Rooms.	Present Number of Men per Room.	Total present Number of Men.	Proposed Number of Men per Room.	Total Proposed Number of Men.	Deficiency of Accommodation in Men.
7	8	56	6	42	14
10	11	110	9	90	20
5	6	30	5	25	5
6	5	30	4	24	6
28	—	226	—	181	45

Considering the open position of the upper fort, these rooms would accommodate 181 men, leaving a deficiency of 45 men to be otherwise placed. The proposed reduction would afford only about 660 cubic feet per man, which is certainly not an extravagant allowance. It has been stated to us that in the hot weather the men often take their beds out of the rooms and sleep in the open air under the arches running along the front of their barracks, on account of the heat occasioned by the crowding within. All the bedsteads are of iron.

Ventilation.—None of the rooms have any special means of ventilation except by the doors and windows. In Nos. 1 to 20 inclusive, which are the principal barrack rooms, there is one window over the door, and two on the side opposite the door. No. 6 room has also a window on each side of the door. In Nos. 21 to 48 inclusive, there is one window over the door and one on the side opposite. No. 34 has another window on the same side as the door, and No. 41 has one on the side adjacent to the door. No. 49 has a window on each side of the door. No. 50 has two windows on the same side as the door. No. 51 has two windows on the side adjacent to the door, and one opposite to them. Nos. 53 to 62 inclusive, have one window each on the side opposite to the door, and Nos. 63 to 73 inclusive have one window on the side opposite to the door.

All the windows, especially those in the men's rooms, are very small in size. The largest are only 3 feet 9 inches by 2 feet 2 inches, and the smallest are 2 feet 7 inches by 1 foot 7 inches. None of them open at the top, and all of them are not supplied with glass, for in almost every room one or more of the windows have only wooden shutters. When these wooden shutters are left open, ventilation is more or less effectual, but in windy, rainy, or cold weather they are generally closed, and there is hence no ventilation. Practically the rooms are seldom ventilated, because there is generally some one who objects to the shutters being open, and they are closed to avoid disputes.

The windows should be enlarged and glazed. Separate ventilating arrangements, with shafts carried from the ceiling of each room above the roof, together with inlets for fresh air of the dimensions laid down in the preceding part of this report, are necessary for health. *See* Plan X. To show the importance of this, and also the necessity of preventing overcrowding and of improving the drainage of these barracks, it is sufficient to state that, notwithstanding their elevated position and their proximity to the sea, the rooms had to be abandoned in 1850 on account of cholera.

Lighting.—Gas pipes are laid on to the barrack rooms, but gas has not yet been supplied owing to some difficulty in making arrangements with the gas company. This should be settled at once, and the present unsatisfactory mode of lighting discontinued. There are only small oil lamps; used as long as the ration of oil for the week lasts, and then the men have to buy candles.

Ablution Rooms.—There is one ablution room, partly closed in front by a screen wall about eight feet high, leaving free space above for ventilation. There is a stone bench for basins, with six taps supplying *salt water* only. This room used to be occupied for playing bagatelle, because the men objected to use salt water, with which they could not wash themselves. At present fresh water for washing has to be carried from pumps in the barrack square. It ought to be laid on from a cistern to the present salt water taps. Because by that means a definite daily allowance would be available for purposes of cleanliness.

Bathing Accommodation.—None. Three baths supplied with fresh water would be required to afford the necessary means of cleanliness to the men. Space walled off and lighted might be found for them in the ablution room.

Cook-houses.—There are two cook-houses, 17 feet 6 inches long by 12 feet 10 inches wide, each supplied with four boilers, but no ovens. The men often get their dinners baked out of the Fort in consequence of the absence of means of varying the cooking, at a great additional expense to the mess. These cookhouses have neither drainage nor water supply. Water has to be carried from the pump, and the refuse water is carried out and thrown down a drain close to the men's privy.

Wash-houses.—There are two wash-houses; one fitted with two boilers, and the other with ten charcoal stoves. There are no other conveniences for washing. The linen is dried on the roofs of the buildings, but as the smoke from the boilers soils it, the boilers are never used. One of the barrack urinals is next door to one of these wash-houses.

Latrines.—There are latrines both for men and women, with water troughs of Maltese stone. Water is thrown into them every morning, and they can be flushed into a drain, which is supposed to run direct into the sea. The construction and material of these latrines are very imperfect, and give rise to great nuisance. There are no proper seats, only a rail being provided, and there are no divisions. They require entire re-construction, with troughs on Macfarlane's or Jenning's pattern, and a proper water supply.

Drainage.—Very little appears to be known as to the drainage of the fort, or as to the dimensions either of sewers or drains. One drain we found discharging itself through the works of Upper St. Elmo down the face of the lofty wall into an open space of ground between the works and the military prison in Lower St. Elmo. The drains are merely troughs cut in the soft porous rock, which absorbs a great part of the fluids they are intended to remove. They should be replaced by close earthenware pipes.

The main drain connected with the latrines is carried the whole breadth of the fort and discharged through the works into the sea. The drainage is said to be sufficient to carry away all surface and refuse water. Most of the fluid refuse is thrown down the men's latrine.

Cleansing.—There are two ashpits in close confined positions, into which all the solid refuse of the barracks is thrown until it is removed by the contractor. These ashpits were in a most offensive and unwholesome condition at the time of our inspection. They ought to be abolished, and all the refuse collected in iron boxes and removed every day. The stable dung from four horses is removed daily, and there can be no reason why all the other refuse should not be dealt with in the same manner.

Officers' Quarters.—These are in rooms built against the rock, and the result is that fever is not uncommon among their occupants. In this and in all similar cases we are of opinion that a well ventilated and drained area should be formed between the rooms and the rock so as to leave an open space between the rock and the quarters to afford a free circulation of air.

Quarters for Married Non-Commissioned Officers and Soldiers.—There are no special quarters for married people; and a number of small soldier's rooms are mis-appropriated to this purpose. Some have only one room, with a door at one end and a window at the other. Some quarters have a small yard in front, containing a fireplace for cooking. The rooms have generally fireplaces and glazed windows.

Canteen.—The canteen is very small and not in good condition. It could be made more comfortable, but there is no room to enlarge it.

Prison Cells.—There are some cells in Upper St. Elmo attached to the military prison, but not properly arranged for keeping the prisoners separate. Each cell has to be occupied by five men, and the ventilation is not sufficient. There is a window over the door of each cell, and also loopholes.

The guard-room cells are quite unfit for occupation. They have no ventilation except into a dark unventilated passage. There are two lock-up rooms, one with a large ventilating skylight, the other is unfit for occupation.

Guard-room.—This room is walled off from the arch of the gateway. It is not good. The guard bed is made of two parts, to turn up, in order to give more space on the floor, and to enable the space under the bed to be cleaned.

The following are the Sanitary Improvements required for Upper St. Elmo.—1. Diminution of overcrowding to the extent shown in the preceding table.

2. Permanent ventilation by shafts carried through the roof, as in Plan X., and inlets for fresh air near the ceilings of all the rooms. Glass to be used for windows instead of boards. Gas to be supplied for lighting.

3. A constant supply of fresh water from a cistern to be provided for the ablution room. Baths with water to be placed in a space cut off from the ablution room.

4. Cookhouses to be provided with the new steel boilers and oven for economizing fuel (Plan XVIII.,) and supplied with water, and drained.

5. Fixed tubs with water to be provided for the women's wash-house.

6. Latrines to be reconstructed with Macfarlane's or Jennings' apparatus, Plans XII. and XIII., and supplied with water for flushing. If fresh water is not available, brackish or salt water to be used.

7. Drainage to be improved on the principles laid down in the previous part of this report. Ashpits to be abolished, iron boxes substituted, and refuse removed daily.

8. All quarters built against the rock to be ventilated by shafts carried up from the back, and the rock to be cut away, leaving an area to ensure thorough ventilation behind.

9. Canteen to be improved.

10. Guard room cells to be improved if possible, or to be abandoned. Ventilation of all cells to be increased.

LOWER ST. ELMO.—This work is situated to the west and immediately under Upper St. Elmo. It consists of a long, confined, deep-sunk area, the surface of which is only four feet above the sea-level, and surrounded on all sides by lofty walls excluding the sea breeze. On the side of the court towards the sea is a range of casemates in three floors sunk below the level of the terreplein of the curtains outside; they were constructed by the Knights as bombproof stores, and to protect women during a seige, but were never intended for permanent human habitation. They have nevertheless been occupied for many years by troops, and from first to last have entailed a large amount of suffering and mortality upon their successive occupants, as well as great pecuniary loss on the country. About 30 years ago the ground floor, constituting a third of the accommodation, was abandoned on account of damp, from the floor being close on the sea-level, and from its excessive unhealthiness, since which event there has been an improvement in the sanitary condition of the troops.

The total area of ground within the boundary of the work is 1 acre 2 roods 22 poles. The surface soil is pulverized rock, and the subsoil is the sandstone on which the works are situated.

The casemates present a long front, bent at the flanks, to the parade ground, and as their windows face towards the south without any protection from the sun's rays, they are exposed to excessive heat in summer. On the side of the court opposite to them is part of the lofty works of Upper St. Elmo, the military prison, constructed on a shelf of rock at a higher level, and the armoury. There is a stable for five horses in the left flank of the barracks, under the officers' quarters, and next door to the serjeants' mess; and close to the stable there are four officers' quarters. In this position, very faulty in structure and also unhealthy, is an extremely offensive privy in a casemate. Part of the space of the parade ground is taken up by two ball courts, and the main drain from Upper St. Elmo runs the whole length of the parade ground, receiving the drainage of privies, wash-houses, &c., in its course, and is ultimately carried through the works into the quarantine harbour.

There are in all 38 rooms in this barrack, with regulation space for 756 non-commissioned officers and men, the details of which are given in the following table:—

Date of Construction: time of the Knights.
Total Number of Rooms, 38.
Total Regulation Number of Men, 748.

Barrack Rooms.	Regulation Number of Men in each Room.	Dimensions of Rooms.			Cubic Feet per Man.	Superficial Area in Ft. per Man of Floor Space.	Windows.		
		Length.	Breadth.	Height.			No.	Height.	Width.
Lower Tier.		Ft. in.	Ft. in.	Ft. in.				Ft. in.	Ft. in.
No. 1	- - -	54 6	21 7	4 8 9 10	Condemned		1	3 9	6 6
2	- - -	54 6	21 7	4 8 9 10			1	3 9	6 6
3	- - -	54 6	21 7	4 8 9 10			1	2 6	6 6
4	- - -	54 6	21 7	4 8 9 10			1	4 9	6 6

Barrack Rooms.	Regulation Number of Men in each Room.	Dimensions of Rooms.						Cubic Feet per Man.	Superficial Area in Ft. per Man of Floor Space.	Windows.				
		Length.		Breadth.		Height.				No.	Height.		Width.	
No.		Ft.	in.	Ft.	in.	Ft.	in.				Ft.	in.	Ft.	in.
5	- - -	54	6	21	7	4 9	8 10	Condemned		1	4	9	6	6
6	- - -	54	6	21	7	4 9	8 10			1	4	9	6	6
7	- - -	54	6	21	7	4 9	8 10			1	3	6	8	0
8	- - -	54	6	21	7	4 9	8 10			1	3	6	6	6
9	- - -	54	6	21	7	4 9	8 10			1	3	6	6	6
10	- - -	54	6	21	7	4 9	8 10			1	3	6	6	6
11	- - -	54	6	21	7	4 9	8 10			1	3	6	6	6
12	- - -	54	6	21	7	4 9	8 10			1	3	6	6	6
13	- - -	54	6	21	7	4 9	8 10			1	3	6	6	6
14	- - -	54	6	21	7	4 9	8 10			1	3	6	6	6
15	- - -	54	6	21	7	4 9	8 10			1	3	6	6	6
Centre Tier.														
1	24	53	0	21	10	5 10	0 8	682	48	1	10	8	5	2
2	24	55	0	21	10	5 10	0 8	657	50	1	10	8	5	2
3	24	55	0	21	10	5 10	0 8	657	50	1	10	8	5	2
4	24	54	6	21	10	5 10	0 11	680	$49\frac{1}{2}$	1	10	8	5	2
5	24	55	0	21	10	5 10	0 8	657	50	1	10	8	5	2
6	24	57	0	21	10	5 10	0 8	699	$51\frac{3}{4}$	1	10	8	5	2
7	24	56	7	21	10	5 10	0 6	719	$51\frac{1}{2}$	1	10	8	5	2
8	24	56	4	21	10	5 10	0 8	724	$49\frac{1}{2}$	1	10	8	5	2
9	24	56	4	21	10	5 10	0 8	724	$49\frac{1}{2}$	1	10	8	5	2
10	24	54	3	21	10	5 10	0 9	665	$49\frac{1}{3}$	1	10	8	5	2
11	24	55	0	21	10	5 10	0 8	657	50	1	10	8	5	2
12	24	54	0	21	0	5 10	0 8	666	$47\frac{1}{4}$	1	10	8	5	2
13	24	52	6	21	10	5 10	0 8	675	$47\frac{3}{4}$	1	—		—	
13A	1	16	0	21	0	5 10	0 8	4,736	336	1	—		—	
14	24	51	9	21	4	5 10	0 6	652	46	1	10	8	5	2
Upper Tier.														
1	24	53	8	21	10	9 6	6 8	672	$48\frac{5}{6}$	1	10	8	5	2
2	24	55	9	21	10	9 6	6 6	692	$56\frac{3}{4}$	1	10	8	5	2
3	24	55	8	21	10	9 6	6 6	691	$56\frac{3}{4}$	1	10	8	5	2
4	24	56	0	21	10	9 6	7 5	695	$50\frac{11}{12}$	1	10	8	5	2
5	24	55	8	21	10	6 6	7 5	691	$56\frac{3}{4}$	1	10	8	5	2
6	24	58	0	21	10	9 6	7 5	719	$52\frac{3}{4}$	1	10	8	5	2
7	24	58	0	21	10	9 6	7 5	719	$52\frac{3}{4}$	1	10	8	5	2
8	24	57	8	21	10	9 6	6 8	$724\frac{1}{2}$	$50\frac{3}{4}$	1	10	8	5	2

Barrack Rooms.	Regulation Number of Men in each Room.	Dimensions of Rooms.						Cubic Feet per Man.	Superficial Area in Ft. per Man of Floor Space.	Windows.				
		Length.		Breadth.		Height.				No.	Height.		Width.	
No.		Ft.	in.	Ft.	in.	Ft.	in.				Ft.	in.	Ft.	in.
9	24	55	7	21	10	9 6	4 10	695	50$\frac{5}{12}$	1	10	8	5	2
10	24	55	8	21	10	9 6	4 10	696	56$\frac{3}{4}$	1	10	8	5	2
11	24	55	0	21	0	9 6	4 11	694	50	1	10	8	5	2
12	24	55	5	21	10	9 6	4 10	699	50$\frac{1}{3}$	1	10	9	5	2
13	24	53	4	21	10	9 6	4 9	664	48	1	10	8	5	2
13A	1	19	0	21	6	9 6	0 4	5,341	408	2	8	3	5	0
14	24	54	0	21	5	9 6	0 10	655	48	1	10	0	5	2
16	38	70 8	9 0	24 17	0 6	8 6 6 6	4 8 6 8	568	48	1	9	2	6	0
17	38	79	6	24	6	8 6	4 8	650	51	1	9	2	6	0
Staff Serjeants' Quarters.														
1	1	18	2	9	0	12	0	1,962	163	1	3	6	3	0
2	1	17	6	11	10	12	0	2,484	207	1	3	6	3	0
3	1	17	6	14	3	11	9	2,925	249	1 1 1	2 2 3	3 3 6	1 1 3	10 8 0
4	1	17	2	15	6	7 3	10 0	2,441	266	2 1	5 1	3 9	3 3	0 6
5	1	17	4	16	6	8 6	6 0	3,639	286	2 1	5 1	3 9	3 3	0 6
6	1	17	4	16	6	8 6	6 0	3,639	286	2 1	5 1	3 9	3 3	0 6
Guard Room -	11	27	0	23	0	16	3	917	56	2	2	2	2	11*
Prison Cells, each	6	8	0	7	0	10	3	574	56	—	—		—	

* Embrasures.

The lower tier of rooms, struck off the barrack accommodation, is now appropriated for reading and day rooms, school, cook-houses, serjeants' mess, canteen, &c., and hence the available accommodation shown in the table consists of 30 men's rooms with space for 748 men, at somewhat less than 700 cubic feet and about 50 square feet per man. This amount of space, though apparently large, constitutes overcrowding in such a locality, and the men have besides fully a third less of superficial area than they ought to have, on account of the height of the arches, nearly 16 feet.

To meet the requirements of health as far as practicable in the existing state of the barrack accommodation we would propose the reduction in the following table, which shows a deficiency of accommodation for 132 men.

Rooms.		Present Number of Men per Room.	Total present Number of Men.	Proposed Number of Men per Room.	Total proposed Number of Men.	Deficiency of Accommodation in Men.
28 Rooms	1 to 14 on each Floor	24	672	20	560	112
No. 16	- -	38	38	26	26	12
„ 17	- -	38	38	30	30	8
Total	- -	—	748	—	616	132

The construction of the rooms is as follows:—Like other casemates, they have one end to the open air, but instead of this end containing a door and one or more windows, it has only one window, 10 feet 8 inches high by 5 feet 2 inches wide, to afford light and air to an arch 55 to 58 feet deep. At the end opposite the window the arch abuts directly on the soft porous sandstone rock of the terreplein, which forms its end wall. All the floors are of stone. Entrance is obtained to the different floors by a staircase at each end of the line, and all the casemates communicate with each other by a door at the end nearest the window. Hence, the rooms on each floor all communicate with each other, an arrangement which, however convenient it may be for stores, is the very worst that could be adopted for barrack-rooms, for it enables the foul air to be wafted hither and thither throughout the whole range.

The only way to remedy this great evil would be to carry open terraces on pillars or iron columns along each floor, to answer the double purpose of shade from the sun and means of access, to provide each casemate with a door, and as large an amount of window space as practicable, and to build up the communications between the casemates, so as to give each casemate a separate ventilation. Close to the doorway of each room is a very small serjeant's bunk, partitioned off. These have neither direct light nor ventilation, and can be neither healthy nor comfortable. They should have some direct communication with the outer air, or be entirely removed. A serious cause of unhealthiness in these rooms is the ends of the rooms being formed of the solid rock. The only way to remedy this evil would be to isolate the casemates altogether from the rock, by forming a well ventilated area three or four feet wide all the way along behind them.

Ventilation.—Some years ago an attempt was made to ventilate these rooms by carrying up a shaft in the roof at the far end. It was too small, and insufficient, and no fresh air was introduced. Lately, additional shafts have been carried up, of large sectional area, and inlets for fresh air have been provided above the windows. These improvements are reported to be much more efficient; and as the barracks have been more healthy since they were introduced, we consider that it would be better to give them a sufficient trial before making any further alterations in the ventilation.

Lighting.—The barracks were at the time of our inspection lighted by oil lamps, but gas fixtures had been provided, and as soon as the difficulties in the way of obtaining a supply of gas could be removed, it was intended to use it for lighting.

Ablution and Bath Accommodation.—There is one ablution room in a casemate 45 feet long by 30 feet broad, close to the privy. There are stone benches for supporting iron basins along the walls, and 20 water taps, supplied by the tank adjoining. This tank is 26 feet deep, but it ceases to supply water to the taps when the level falls below 15 feet. The ablution room is situated in a narrow, dark, damp corner. Beyond it, and entered from it, is the issuing store for fuel and lime. There are gratings for the floor, which is constantly wet, from water running over it. There are no pegs, nor forms to sit on; there are no baths.

Over this damp, dark room there are two large barrack rooms which have been condemned as unhealthy. They are, indeed, utterly unfit for human habitation. Close to them there is a small range of rooms inhabited by married soldiers. They have light and air only from the narrow space referred to. Their back wall is the rock, in which a large water tank is excavated; they are dark, damp, unwholesome, and not fit for occupation.

Cook-houses.—There are two, situated in ground-floor casemates, one for each wing. They contain ten boilers each, of the usual form, and there is a small oven, which appears to be little used. The improved steel boilers and oven should be substituted for the present apparatus.

Women's Wash-house.—This is a semicircular shed opposite the centre of the barrack. It has stone troughs and slabs. Linen is dried on the roof of the barracks. There are no boilers, but there are small fireplaces in a shed, over which water can be heated. The accommodation is said to be sufficient.

Water for barrack use is derived from a large tank; the quality is said to be good.

Privies and urinals.—There is one long privy for men in a casemate at the narrow close end of the parade ground already mentioned. The arrangement is of the usual ladder construction, with a stone trough, out of which the contents are flushed into the sea with water raised by force pumps. There is a urinal at the entrance door. Both are very offensive, and require reconstruction with Macfarlane's or Jennings' apparatus. The casemate should also have more abundant ventilation, by taking down all the wall under the arch, and putting in a louvred frame.

Drainage.—We have been able to obtain no definite account of the drainage of the barrack, and apparently the information could not be obtained without actually opening the drains, which after recent experience it would not be safe to do without removing the troops out of the barracks.

As might be inferred from the levels, the fall is insufficient for removing the surface drainage, together with the soil from the privies belonging to the military prison, and both are retained in cesspits and ill-constructed drains, which are nothing but additional cesspits of larger area. The contents, except such as may sink into the porous rock, have to be removed by hand labour once a week; so that in reality this barrack is not drained, and the present arrangements are very offensive and dangerous to health. One of the cesspits is 40 yards, the other about 20 yards from the nearest quarters They should be abolished, and the drainage should be conveyed away in impervious pipes. Ample fall can be obtained for all the latrine drainage by simply raising the latrines.

The outlets of the city sewers to the south of Lower St. Elmo, are above the water level; and great nuisance is experienced in the barrack whenever the wind blows over them to the Fort. These outlets require to be improved, and extended into deep water by means of iron pipes.

Cleansing.—The parade grounds are cleansed every day. The barrack refuse is carried to an ashpit close to the privies, from which it is removed, together with the stable dung, once a day. The ashpit is too deep, and like all such places, is apt to become a nuisance. It would be much better to fill it up to the level of the ground, pave and drain it, and provide iron boxes to receive the refuse, out of which it could be emptied for removal.

Married Quarters.—There are none specially appropriated; some unhealthy rooms against the rock, occupied as such, we have already noticed. Sometimes married people are accommodated in the ground-floor casemates, as many as five families being lodged in some of them.

Sanitary Improvements required for Lower St. Elmo.—1. Terraced verandahs to be carried along the south front to shade it and give access to rooms. Each room to have a door opening from the terrace, and the communications between the rooms to be built up. Each non-commissioned officer's room to have a window, or the room to be removed altogether. An area with ventilation to be formed between the back of the casemates and the rock.

2. Gas to be laid on.
3. Ablution room to be improved, to have ablution basins as in plan XV., supplied with water, and to have pegs and forms.
4. Cookhouse to have improved steel boilers and ovens, Plan XVIII., or a Benham's apparatus to cook for 400 men.
5. Latrines and urinals to be improved on Macfarlane's or Jenning's principle, Plans XII., XIII., and XIV.
6. Drainage to be improved and the cesspits abolished. Outlets to be improved.
7. Ashpit to be abolished and iron boxes, with daily removal, substituted.
8. Better married quarters to be provided.

The Military Prison, Lower St. Elmo.—This establishment is within the same enclosure as Lower St. Elmo, and is built on a shelf of rock at a higher elevation. It is of the construction usually adopted at home, and consists of three floors of cells opening out of a corridor, one side of which is formed by the walls of the cells, and the other side by scarped sandstone rock. In this rock is a large water tank, the floor of which is about 6 feet above the level of the floor of the corridor. The corridor is roofed over, and has ventilating lights above, which are kept closed for fear the rain should beat in. The interior is consequently very imperfectly ventilated, and the air is rendered more foul by the method adopted for supplying air to the corridor. To do this, an air duct has been carried from the door of a most offensive privy in the barrack yard, along under the floor of the prison corridor, and large grated openings allow the foul air to pour directly into the corridor. So offensive was the smell from these gratings that they had to be covered up. This should be remedied by closing up the present inlet and by opening another in a suitable position.

There are 33 cells in the main building and a few others detached, which are made over to Lower St. Elmo for guard-room cells. Each prison cell is 11 feet long by 6 feet wide, and from 10 feet to 10 feet 6 inches high, giving from 660 to 690 cubic feet to each prisoner ; too little for health, especially in such a locality. The prison was built in 1850, when the garrison was under 3,000 men. In that year the committals were 174 = 5·8 per cent. of the strength. In 1859 the garrison had been doubled, and the committals had risen to 512 = 8·6 per cent. of the strength, while the prison accommodation remained the same. There is no space to enlarge it, and even if there were it would be unadvisable to do so on account of defect of position. The privies are too close to the building, the court-yard is too small. The kitchen is not sufficient for the increased number of prisoners.

On account of deficiency of accommodation, prisoners undergoing sentences have to be sent to the dark, crowded, and unhealthy associated cells in Upper St. Elmo. Additional prison accommodation is required to meet the wants of the garrison, for which a very good site might be found on one of the bastions of the Cotonera lines.

2.—Marsamuscetto Barrack.

This barrack was formerly a store consisting of three floors. The basement is still used for stores; the first floor contains the men's barrack accommodation, above which are two ranges of rooms with an open passage between them, one of which, to the front, is occupied as officers' quarters, and the range behind is used as serjeants' quarters, library, &c.

The building is situated on the west side of Valetta, at a low level as compared with the neighbouring ground, and close to the sea, although considerably above it. The houses are very near the barrack, and nearly all winds except those from west and north-west are either cut off by the town, or have to reach the barrack after passing through the streets. The sea, close at hand, receives part of the town drainage in water too shallow to admit of sufficient dilution, and as there is no tide, the odour is at certain periods most offensive and unwholesome. Behind and above the level of the barrack, one of the town aqueducts is carried through the rock, and when this has happened to get out of order, the water has found its way into the barrack. The ends of the rooms next the rock are always more or less damp.

The men's barrack consists of two long casemates placed side by side, abutting at the end furthest from the front on the solid rock. There is a single entrance door into one of the rooms, and the other room has to be reached by a door through the intervening wall. From this second room there is a small door leading into a confined court, surrounded by high walls, containing the cook-houses, privies, urinals, and ashpits. Each room has only one window, 73 feet from the further end of the room. The floors are of soft Maltese stone.

The following table gives the details of the accommodation:—

Rooms.	Number of Men per Room.	Dimensions.				Cubic Feet per Man.	Superficial Area in Feet per Man.	Windows.		
		Length.	Breadth.	Height.	Cubic Contents per Room.			Number.	Height.	Width.
No.		Ft. in.	Ft. in.	Ft. in.	Ft.				Ft. in.	Ft. in.
1	42	73 0	26 3	11 9 9 0	33,630	800	45½	1 1	9 9 6 0	7 2 3 0
2	42	73 0	26 3	11 9 9 0	33,630	800	45½	1 1	9 9 6 4	7 2 2 0
Guard Room -	12	26 6	18 1	13 9	6,588	549	39	2	6 6	3 6

The cubic space *per se* ought to be sufficient, but the casemates are nearly 21 feet high, and the superficial area per bed ought to be between 60 and 70 square feet in such a situation. Besides this defect, the beds are necessarily arranged along the walls, and the wall space affords about 3½ feet per bed only, which is about 1½ feet less than a healthy barrack room ought to give. The rooms even for temporary occupancy are not suited for more than 30 men each.

These facts will show that the construction is very unsuitable for a barrack, and that the place does not admit of material improvement.

Ventilation.—There is a shaft carried up from the top of the arch farthest from the door, intended to act as an outlet, but there are no inlets for fresh air. One of large area ought to be placed over each end window, close to the top of the arch. The ventilation at present is by no means sufficient.

There are no fireplaces.

The rooms are very imperfectly lighted by oil lamps. Gas pipes are laid on, but no gas is supplied.

Ablution Accommodation.—There is a small ablution room in the yard, with stone benches and basins. Water is not laid on; and there are no baths. The floor of the ablution room is not in a good state.

Cook-house.—The cook-house has three boilers, but no oven, and the men have to send their dinners to be baked outside. Water for the cook-house is obtained from a pump in the yard. There is no ventilation.

Privies and Urinals.—These conveniences are in the yard, and of the usual construction. They are drained into the sea, and flushed daily through one of the town sewers. The buildings are not sufficiently ventilated.

The barrack refuse is collected in ashpits and removed daily. It would be better to substitute an iron box; which could be removed and its contents emptied into the cart.

Officers' Quarters.—These quarters are tolerably good and healthy, but they are damp at times from the nature of the stone.

The Guard Room is good, but by no means sufficiently ventilated, it should have suitable openings near the roof.

At the time we inspected this barrack there were very few men in it, and the doors and windows were open. It was nevertheless very close and the air was unwholesome; of course at night it must be still more so. It cannot be made a healthy barrack, although it may be improved by increasing the ventilation.

Sanitary Improvements required.—1. Large inlets for fresh air, louvred to throw the current up towards the roof, to be introduced close to the top of the arch in the front wall of each room.

2. Gas to be laid on

3. Floor of ablution room to be relaid with hard stone, water to be laid on, and one bath provided.

4. Improved steel boilers and oven Plan XVIII. to be provided for the cook-house, water to be laid on, and the place better ventilated.

5. Privies and urinals to be reconstructed on Macfarlane's or Jennings' principle, Plans XII., XIII., XIV., with a constant water supply.

6. Ashpit to be abolished, an iron box substituted, and refuse to be removed daily.

7. Ventilation of guard room to be improved.

3.—St. James' Cavalier and Strada Torre Barracks.

St. James' Cavalier is a lofty solid work situated at the highest point of Valetta, and overlooking the surrounding country. Its position is a healthy one, but the structure of the lower part of the barracks is certainly not conducive to health. The Cavalier contains three floors of casemated rooms. The upper floor is reached by a long ramp, entering on the eastern side of the cavalier, and constructed in the solid masonry. The access to the two lower floors is from a narrow street on the western side.

The upper floor is known by the name of the Cavalier barracks, the other floors are called Strada Torre barracks.

Cavalier Barracks.—This accommodation consists of a series of six casemated rooms on the northern face of the cavalier, the two corner rooms are longer than the others, and extend about half their length along the east and west sides of the cavalier. All of them communicate with each other by large arches, and they are reached by one doorway about half-way along the ramp. These rooms have one rather small window each, facing to the north.

The two end rooms have one window each, facing one to the east the other to the west. The ramp, which is a large archway, opens to the outer air on the east side, and passes along the entire length of the back of the rooms, and thus, although the structure is not all that could be desired, it is still such as to secure free admission of all healthy winds to the rooms, if the windows and doors are properly used.

There are two other rooms imbedded in the masonry, without any direct light or ventilation. One of these is used as a lavatory, and has a pump for supplying water.

The following table gives the accommodation:—

Date of Construction, the time of the Knights.
Total Number of Rooms, 8.
Total Regulation Number of Men, 136.

Barrack Rooms.	Regulation Number of Men in each Room.	Dimensions of Rooms.			Cubic Feet per Man.	Superficial Area in Ft. per Man of Floor Space.	Windows.		
		Length	Breadth.	Height.			No.	Height.	Width.
No.		Ft. in.	Ft. in.	Ft. in.				Ft. in.	Ft. in.
1	32	56 4	24 0	11 9 8 0	585	42	1	6 6	3 10
2	18	38 0	24 0	11 9 8 0	882	50	1	6 6	3 10
3	18	38 0	24 0	11 9 8 0	882	50	1	6 6	3 10
4	18	38 0	24 0	11 9 8 0	882	50	1	6 6	3 10
5	18	38 0	24 0	11 9 8 0	882	50	1	6 6	3 10
6	32	56 4	24 0	11 0 8 0	585	42	1	6 6	3 10
Serjeant's Bunk	1	14 0	6 0	1 6 9 6	882	84	1	3 6	2 10
Serjeant's Bunk	1	14 0	6 0	1 6 9 6	882	84	1	3 6	2 10
Guard Room -	10	12 2	12 2	12 0	177	14¾	2	2 9	2 6

The great height of the rooms, 19 feet 9 inches, makes them more overcrowded than the cubic space indicates. This is especially the case with Nos. 1 and 6, in which the men have only 42 square feet each. These rooms ought not to accommodate more than 23 men per room, which would reduce the total accommodation from 136 to 118 men.

Ventilation.—In all the rooms the window space is deficient and there are no independent means of ventilation except by the chance opening of the windows situated at from 38 to 56 feet from the most distant beds.

As there is no ground belonging to these casemates, the accessories are very few in number. There is an ablution room, but no baths. In an angle of the ramp there are a few boilers for cooking. The latrines are at some distance off, in a communication leading to the main ditch of Valetta.

This barrack requires the following sanitary improvements:—

1. All the windows to be enlarged.
2. Ventilating openings properly louvred to be made close to the top of the arches along the front of all the rooms, and along the sides of the two end rooms.
3. The numbers of men in rooms 1 and 6 to be reduced from 32 to 23 men per room.

These are all the improvements the place admits of.

STRADA TORRE BARRACKS.—These barracks, as already stated, are in two floors under the Cavalier barracks in the rear face of the works. They form one side of a small triangular yard. Another side is bounded by a block of four arched rooms used as barrack rooms, although originally intended for stores. The third side of the yard is formed by lofty walls of adjoining buildings, against which in the yard itself are a number of one-story erections used as cook-house, ablution room, &c.

The ventilation for the whole barrack is derived from this court, and the air cannot be otherwise than stagnant and impure. There are 10 rooms in the cavalier part of the barrack, five above and five below. An arched terrace runs along the upper floor, from which all the upper rooms are entered. Each room is 50 feet long, 24 feet wide, and 9 feet high to the spring of the arch, and has only one opening, namely the door at the end. These rooms stand on the construction for 29 men each, 290 men in all.

All these rooms are more or less dark. Some of the lower rooms have openings through the roof into the upper rooms. These lower rooms are only cellars. The upper rooms are partly used as married quarters.

They are unfit for occupation by troops, for they do not admit of being sufficiently lighted and ventilated.

The other block detached from the cavalier contains 4 barrack rooms 80 feet long, 18 feet wide, and 9 feet high to the spring of the arch, which were occupied by 39 men each; giving the total accommodation in this bad barrack at 476 men.

These four rooms have windows on one side, and each window is common to the two floors, so that all the foul air from the rooms below passes into the rooms above. The upper rooms have a lantern in the roof for light and ventilation. The floor of the lower rooms is below the level of the ground. Like the others, they are unfit for troops. All of them appear to have been originally intended for stores, and they are fit for nothing else.

The Ablution Room is in the yard. It has troughs, and there is a large foul open drain beneath, in the floor. The married people cook on the top of it, in the open air.

The Latrine is of the usual construction and requires ventilation.

There is *a Cook-house* with boilers and no oven, and without sufficient ventilation.

The Canteen is in a dark casemate, where is also the serjeants' mess.

The Guard Room is part of a casemate, the other part of which is a store. The lock-up is used as an orderly room.

The only recommendation we have to make as regards Strada Torre barracks is that they be abandoned as speedily as possible.

4.—Floriana Barrack.

This barrack is situated on the west side of Floriana, in one of the healthiest districts in Malta, at some elevation above the quarantine harbour, and has ample facilities for drainage. The site ought to have a free external ventilation; but this great and essential condition of health is entirely neutralized by the plan and construction of the buildings, which are so defective that the barrack has been long notoriously unhealthy.

In condemning the construction as quite unsuitable for a barrack, it is only fair to state that the builders never contemplated its being used for such a purpose; they built it for a sail-cloth manufactory. Its application to barrack purposes has been a subsequent idea.

The buildings occupy a long narrow strip of ground about 8,000 square yards in area. The western side of the ground is bounded by a parapet crowning a high wall overlooking the harbour. The eastern side is bounded by a lofty line of building, the ground plan of which consists of small casemated rooms belonging to the barrack, used at present as married quarters, reading rooms, stores, &c., and the upper floors belong to the civil hospital.

The barrack accommodation consists of 12 casemates built side by side. Their outer or western ends are formed by the dead wall of the works which has hitherto had no openings in it, and the eastern ends form one side of a narrow alley, about 25 feet wide, separating the barracks from the lofty walls of the civil hospital and almshouse. The entrance doors and the windows open from this alley, from which the only light and ventilation are obtained, and as a result the air about these casemates, as well as that within them is stagnant, close, and very impure. At the time of our inspection these casemates were occupied by part of the 1st battalion 22nd regiment. The average strength for six months, April to September 1861 inclusive, had been 494 men, of whom 147 had been admitted to hospital, on account of continued fever, with occasional cases of typhoid fever. During the same six months 222 men were in huts, and were once changed by a corresponding number of men from the barracks. These men yielded 57 cases of fevers, so that nearly a third part of the entire force were attacked in six months by this single disease.

The casemates vary in length from 75 feet to 100 feet. They are from 21½ feet to 24 feet 4 inches wide, and 19 feet 3 inches high. The largest casemate holds 54 men, and the others 46 men each. They are connected by doorways through the division walls, and have a circulation of foul air throughout. They constitute in reality one large apartment crossed by division walls with openings in them, and containing, when fully occupied, 560 men. Each casemate has one door to the open air, and one window, so that 12 windows looking towards a dead wall is about the extent of daylight provided for a battalion.

The cubic contents per man vary from 507½ feet to 718½ feet, but as nearly half of the whole space is too high up to be of use, there is considerable surface overcrowding, each man having only from 40 to 43½ square feet.

The following table gives the details of the accommodation:—

Date of Construction: the time of the Knights.
Total Number of Rooms, 45.
Total Regulation Number of Men, 560.

Barrack Rooms.	Regulation Number of Men in each Room.	Dimensions of Rooms.			Cubic Feet per Man.	Superficial Area in Ft. per Man of Floor Space.	Windows.		
		Length.	Breadth.	Height.			No.	Height.	Width.
No.		Ft. in.	Ft. in.	Ft. in.				Ft. in.	Ft. in.
1	46	80 4	24 4	12 3 7 0	702½	42½	1	6 11	6 8
2	46	80 4	24 4	12 3 7 0	702½	42½	1	6 11	6 8
3	46	80 4	24 4	12 3 7 0	702½	42½	1	6 11	6 8
4	46	80 4	24 4	12 3 7 0	702½	42½	1	6 11	6 8
5	46	80 4	24 4	12 3 7 0	702½	42½	1	6 11	6 8
6	46	80 4	24 4	12 3 7 0	702½	42½	1	6 11	6 8
7	46	83 0	24 2	12 3 7 0	718½	43½	1	6 11	6 8
8	46	83 0	24 2	12 3 7 0	718½	43½	1	6 11	6 8
9	46	83 0	24 2	12 3 7 0	718½	43½	1	6 11	6 8
10	46	83 0	24 2	12 3 7 0	718½	43½	1	6 11	6 8
11	46	75 3	24 2	12 3 7 0	651⅓	39½	1	6 11	6 8
12	54	100 0	21 6	9 5 6 4	507½	39¾	1	7 6	4 6
12 *a*	Quartermaster's Store	73 9	13 5	5 0 9 0	- -	- -	1	4 6	4 0
13	Cook-house -	20 6	14 4	10 4 8 6	- -	- -	1	4 6	4 6
14	Coal-hole - -	13 9	9 0	6 3 10 9	- -	- -	1	3 6	0 10
* 15	Cell - -	13 9	9 0	6 3 10 9	- -	- -	1	3 6	0 10
16	Do. - -	13 9	9 0	6 3 10 9	- -	- -	1	3 6	0 10
17	Do. - -	13 9	9 0	6 3 10 9	- -	- -	1	3 6	0 10
18	1	13 7	9 0	6 3 10 9	1,979	122	1 1	3 6 2 6	2 10 2 0
19	1	13 7	9 0	6 3 10 9	1,979	122	1 1	3 6 2 6	2 10 2 0
20	1	13 7	9 0	5 8 9 6	1,736	122	1 1	3 6 2 6	2 10 2 0
21	1	13 7	9 0	7 6 6 0	1,607	122	1 1	3 6 2 6	2 10 2 0
22	1	13 9	9 4	5 6 6 6	1,411	128	1 1	3 6 2 6	2 10 2 0
23	1	13 7	9 3	5 2 5 8	1,225	125	1 1	2 6 2 6	2 6 2 0
24	1	13 7	9 3	3 10 6 2	1,128	125	1 1	2 6 2 6	2 6 2 0
25	1	13 8	9 3	3 4 6 0	1,331	126	1 1	2 6 2 6	1 6 2 0
26	Cook-house -	20 6	13 6	14 9	- -	- -	1	9 0	2 6
27	Issuing Store -	25 10	15 0	7 0 10 0	- -	- -	1	4 0	3 6
28	Tailor's Shop -	25 10	21 9	7 0 9 9	- -	- -	1 2	5 0 5 0	3 0 3 6
29	Serjeants' Mess -	26 0	21 9	7 0 10 0	- -	- .	1 2	5 0 2 10	3 0 2 2
30	Orderly Room -	26 0	21 9	7 0 10 0	- -	- -	1 2	5 0 4 6	3 0 3 0
31	2	26 0	21 9	7 0 10 0	4,231½	282	1 2	5 0 2 6	3 0 2 0
32	2	26 0	21 9	7 0 10 0	4,231½	282	1 2	5 0 2 6	3 0 2 0
33	Canteen - -	26 0	21 9	7 0 10 0	- -	- -	1 2	5 0 2 6	3 0 2 0

Barrack Rooms	Regulation Number of Men in each Room	Dimensions of Rooms.			Cubic Feet per Man.	Superficial Area in Ft. per Man of Floor Space.	Windows.		
		Length.	Breadth.	Height.			No.	Height.	Width.
No.		Ft. in.	Ft. in.	Ft. in.				Ft. in.	Ft. in.
34	4	26 0	21 9	7 0 10 0	2,115¾	141	1 2	5 0 4 6	3 0 3 0
35	2	26 0	21 9	7 0 10 0	4,231½	282	1 2	5 0 2 4	3 0 1 8
36	2	26 0	21 9	7 0 10 0	4,231½	282	1 2	5 0 2 6	3 0 1 10
37	Guard Room -	19 0	19 0	6 10 10 0	- -	- -	1 1	5 0 2 4	3 0 1 10
38	Stables - -	14 6	8 0	8 9	- -	- -	1	5 0	3 0
39	Armourer's Shop -	12 0 14 7	9 0 9 3	12 2 10 4	- -	- -	1 1	3 6 3 8	2 8 2 8
40	1	15 6 10 6 15 5	10 6 8 9 10 5	8 6 8 7 7 2	3,322	414	1 1 1	2 6 2 8 3 4	1 0 2 3 2 8
41	1	19 0	15 6	15 0	4,417	294	1 1	3 3 3 6	2 8 3 2
42	Serjeants'Cook-house	13 10	9 4	6 2 7 6	- -	- -	1	4 6	3 6
43	Store - -	13 8	7 5	3 4 4 0	- -	- -	1	2 4	1 8
44		12 0	6 0	9 0	- -	- -	1	1 10	1 6
GuardRoom in No. 37 Barrack Room	14	19	19	6 10 10 0	375	25¾	1 1	5 0 2 4	3 0 1 10
Prison Cells -	4	18 6	6 0	13 9	1,526 (each)	111	1	3 6	0 10
	*3	13 9	9 0	6 3 10 9	2,016	124			

* Nos. 15, 16, and 17 Rooms.

Overcrowding.—Considering the question of overcrowding with reference to the number of square feet per man allowed in these rooms (which is the only element to guide us) we are of opinion that about one third of the inmates should be removed to give the remainder a fair chance of escape from fever. The accommodation would be as follows:—

Rooms.	Present Number of Men per Room.	Total Number of Men.	Proposed Number of Men per Room.	Total proposed Number of Men.	Deficiency of Accommodation in Men.
No.					
11	46	506	30	330	176
1	54	54	32	32	22
Total -	—	560	—	362	198

Ventilation.—Three shafts have recently been carried through the crown of the arch in each casemate to improve the ventilation, but they are by no means sufficient, as we had reason to know when we were in the rooms. The men themselves said that they felt as if their breath never got away from them.

A considerable improvement was at the same time being carried out on trial, in one of the casemates by opening an embrasure through the dead wall at the end. We are of opinion that a similar opening should be made in each casemate, and also that a large window should be made close to the crown of the arch over the embrasures. Each casemate should be flooded with light and air, an improvement which, together with a reduction in the number of inmates, affords the only chance of reducing their present unhealthiness if this barrack is to be occupied in future.

The casemates under the civil hospital are so placed with reference to the buildings and the higher ground behind, that it is impossible to ventilate them properly. Two or three of them have shafts in the arch, but the rooms are in reality unfit for occupation.

Lighting.—There is a gas lamp over the outer gate, but there are none in the barrack rooms, which are lighted with a ration of 3 ounces of oil per 12 men per day in winter, and 2 ounces in summer. The lighting is very insufficient, and gas ought to be introduced.

Ablution and Bath Accommodation.—There is an ablution shed in the yard but no bath. The accommodation is much too small for the barrack. Water is obtained from a pump and tank.

Cook-houses.—There are three of these; two supplied with the usual iron boilers, and one has a small oven. The improved steel boilers and oven should be substituted for them. Water is not laid on, and the cooks have to carry in all the water required, and to carry out the foul water for there is no drainage.

Wash-houses.—There are no conveniences for washing or drying linen.

Latrines.—There are two sets of latrines, one for men and one for women. They are of the usual form and are flushed with water.

Drainage.—The dimensions of the sewers are imperfectly known. One open surface drain runs the whole length of the barrack. The outlet is into the sea about 300 yards away. The drainage is said to be sufficient, but the surface guttering was not good, and required repair. Foul water was lying in the drains along the front of the men's rooms opposite the doors. Great complaint is made of nuisance from a drain belonging to the civil hospital above. This ought to be thoroughly examined and the cause of complaint removed.

New School-room.—Outside the barrack gate is a newly constructed reading room, library, and school-room, with windows on opposite sides, but without ventilation. Louvres in the ridge are required and inlets at the eaves.

Guard Room and Cells.—There are two sets of prison cells, one at the end of the barrack enclosure, the other recently constructed. The former require more ventilation. The guard room is under the civil hospital, and has no through ventilation. There is no lock-up.

Huts.—Part of the battalion is accommodated in a series of wooden huts in the adjacent ravelin, and in the hornwork and crown work of St. Francis bastion. They are all without adequate ventilation, and require it along the ridge, and being moreover in a very dilapidated state they are only of a temporary character, and can hardly be classed as barrack accommodation.

As there is no provision in Floriana barracks for married non-commissioned officers and soldiers, their families are placed in some of the dilapidated huts in the hornwork, and the accommodation is of a very inferior character.

Sanitary Improvements required.—If this bad barrack is to be occupied it should have the following improvements carried out:—

1. Removing as many men out of each room as will give 75 to 80 square feet each to the remainder.
2. Ventilating and lighting all the casemates by embrasures at the ends furthest from the entrances, with large windows, made to open, over the embrasures.
3. Gas with ventilated burners to be introduced.
4. Ablution and bath accommodation to be improved, as in Plans XV., XVI., and XVII., and water to be laid on.
5. Latrines to be re-constructed with Macfarlane's or Jennings' apparatus, Plans XII. and XIII. and constantly supplied with water.
6. Drainage of the whole barrack to be improved.
7. New school-room to be ventilated.
8. Cook-house to be supplied with improved steel boilers and oven, Plan XVIII.

5.—St. Francis' Barrack, Floriana.

This barrack is situated in a high and airy position near the southern extremity of Floriana. It consists of a single block of rooms fronting the public street, used as a grain store not many years ago. Behind it is an enclosed parade ground on the sides of which are situated the wash-house, cook-house, library, armoury, stores, and latrines. The area is about 900 square yards in extent, and the subsoil is soft sandstone. On the slope below the level of the barrack there is a yard containing officers' quarters, condemned on account of being low, ruinous, and damp. These buildings are, nevertheless, occupied as married quarters and infant school.

The barrack block is constructed in two distinct parts, and the entrance to the square passes through the middle of the front. The part of the block towards the square contains two large arched rooms, one on either side the entrance. They are each 26 feet in height, and have nothing over them. The other part of the block facing to the street is in two floors. On the ground floor are four barrack rooms, two on each side the entrance, and each of these rooms communicates with the corresponding large room behind, by means of openings through the wall.

At the end of each large room and opening out of it there are serjeants' rooms, built against the main block. One of these is said to be damp from being somewhat below the level of the road.

The rooms above are reached by a spacious staircase carried up in front, on the half landing of which, behind them, is a single men's room, at present used as a serjeants' mess. The upper rooms are in reality one apartment divided by partition walls carried only partially up, and the roof is supported on arches running along the centre. There are four rows of beds between the opposite windows in certain rooms.

The following are the details of these rooms:—

Date of Construction of Barrack, about 1807.
Total Number of Rooms, 15.
Total Regulation Number of Men, 329.

Barrack Rooms.	Regulation Number of Men in each Room.	Dimensions of Rooms.			Cubic Feet per Man.	Superficial Area in Ft. per Man of Floor Space.	Windows.		
		Length.	Breadth.	Height.			No.	Height.	Width.
No.		Ft. in.	Ft. in.	Ft. in.				Ft. in.	Ft. in.
1	32	40 3	23 6	17 0	502	29½	1 1	4 3 6 6	2 9 4 4
2	23	40 3	23 6	17 0	699	41	1 1	4 3 6 6	2 9 4 4
	23	40 3	25 3	16 6	729	47¾	1 1	4 3 4 2	2 9 1 10
4	20	40 3	24 0	16 6	797	$48\frac{3}{10}$	1 1	6 6 4 3	4 4 2 9
5	44	64 6	29 0	26 0	1,105	42½	1 2	8 8 6 11	6 10 3 9
6	44	64 6	29 0	26 0	1,105	42½	1 2	8 8 6 11	6 10 3 9
7	9	27 0	13 8	14 0	574	41	1 1	6 6 3 7	4 0 1 6
8	46	58 2	38 4	17 0	824	48½	4 3 1	4 11 5 1 9 7	3 8 4 4 6 2
9	13	30 8	18 4	17 0	736	43¼	1	7 9	5 3
10	36	40 4	31 0	17 0	590	34¾	1 1	5 0 4 0	4 3 3 0
11	39	40 4	26 0	17 0	457	27	1 1 1	5 0 4 0 9 5	4 6 3 0 6 0
Serjeant's Bunk	1	10 0	10 0	16 3	1,625	100	2	3 0	2 8
" "	1	12 3	9 0	9 0	992	110	2 1	1 6 3 0	1 3 1 9
" "	1	12 3	9 0	9 0	992	110	2 1	1 6 3 0	1 3 1 9
" "	1	10 0	10 0	16 3	1,625	100	2	3 0	2 8
Guard Room -	11	30 3	16 3	15 0	670	44½	2 1	5 1 4 6	3 8 1 0
Prison Cells, 6 -	1 each	11 0	6 0	15 0	490	66	1	2 6	1 3

Overcrowding.—It will be seen that on account of the height of the rooms there is considerable surface overcrowding, notwithstanding the comparatively large amount of cubic space allowed per man.

In rooms 1, 10, and 11 the overcrowding is greatest, and about half of the men should be removed out of them. Less surface area is required in this barrack than in the preceding one, because the construction is much better for health. But about 60 to 65 square feet is the smallest amount which should be allowed for each man.

By giving the increase of superficial area required, the number of men per room will be reduced in the following proportions, and the total accommodation will be for 213 instead of for 329 men, showing a deficiency of space for 116 men.

Rooms.	Present Number of Men per Room.	Proposed Number of Men per Room.	Deficiency of Accommodation in Men.
No.			
1	32	16	16
2	23	16	7
3	23	18	5
4	20	14	6
5	44	30	14
6	44	30	14
7	9	6	3
8	46	35	11
9	13	9	4
10	36	21	15
11	39	18	21
Total - -	329	213	116

Ventilation.—Most of the rooms are very deficient in window space, and some of them have rather a sombre aspect. In rooms 2, 3, 4, and 7 the windows are on one side; in Nos. 5, 6, and 1 they are on two adjacent sides; in Nos. 11 and 8 there are windows on three sides; and in rooms 9 and 10 there are opposite windows. The two lofty arched rooms have ventilators in the roof. The other rooms have none.

One of the chief improvements required for this barrack is to increase largely the window space in the lower floor rooms, by increasing the number of windows and cutting down existing windows to bring their sills nearer the floor. Large inlets for fresh air are required, and also outlet shafts carried up from the lower front rooms to the roof. The upper rooms require free roof ventilation, by ventilating turrets of Muir's pattern.

Ablution and Bath Accommodation.—There are no baths, but there is an ablution room in one of the outbuildings behind. It has benches for basins, and a gully grate in the middle of the floor, down which the dirty water escapes. Water is not laid on, but has to be carried from a pump. This room was being completed while we were there.

Cook-house.—There is one cook-house fitted with six boilers and an oven, sufficient to cook for a company. Water for cooking has to be carried from the pump. There is no drainage. The women's cook-house was used as a serjeant's mess kitchen.

Wash-house.—A small wash-house, with stove, washing troughs, and a boiler, has been provided in the same range as the ablution room and cook-house. It is deficient in water and drainage like the others. At the time we saw it, it was used as an orderly room.

Latrines and Urinals.—These are situated on one side of the parade ground, and are both together. The latrines are under cover, and the urinals are outside. They are of the usual construction, and drained into the town sewer. The latrines require roof ventilation, and reconstruction of the troughs to hold water.

Drainage.—Like the Maltese drains generally, the drain of this barrack is most disproportionately large. It is no less than 5 feet high and 2 feet wide, and is intended to receive only the rainfall of a small yard and the drainage of the barrack offices.

There is a very large ashpit, said to be cleared out every day. It would be much better to dispense with it and to provide an iron box for receiving the refuse.

There is no library, except a portion of the armoury used for the purpose.

The Guard room and Cells are at one end of the barrack. The cells open out of the guard room, and they have no other ventilation except through the guard room by means of a window over the passage door. This window should be closed, and the cells and passage ventilated independently. The cells are used as garrison cells because the military prison is too small.

The guard room has no privy or ablution room, and there is no cooking place for the prisoners.

In the yard, on the slope already mentioned, containing buildings intended for officers' quarters, and on the ground floor of this range, somewhat below the surface level, there is the infant school already mentioned, and a quarter for the mistress. Apparently a drain passes under part of the flooring, and foul air escapes from it to such an extent as to occasion great nuisance, and to make the rooms quite unfit for occupation. This defect ought to be carefully inquired into and remedied.

Sanitary Improvements required.—1. Reducing the number of men to the extent specified.

2. Increased window space, and improved ventilation by shafts through the roof, and by inlets near the ceiling, and in the upper rooms by inlets near the ceiling and Muir's ventilators, fig. 19, in the ridge.

3. Latrines to be reconstructed on Macfarlane's or Jennings' plan, Plans XII. and XIII., and supplied with water.

4. Drainage of the barrack to be improved by using pipe drains. Ashpit to be abolished, and an iron box with daily removal of refuse provided.

5. Cook-house to have steel boilers and oven, as in Plan XVIII.

6. Cells to be ventilated.

7. School and schoolmistress' quarters to be removed from the present building until the whole is reconstructed.

PAVILION OFFICERS' QUARTERS.

This is a large building, formerly used as the market of Floriana. It is two floors in height, and has an enclosed square in the middle. It has accommodation for two field officers and 20 officers. Under one end of it, and considerably below the ground level, is a subterranean stable for six horses.

It is very offensive, and the foul air from it passes by the windows into the officers' quarters above. The stable should either be removed or three large ventilating shafts should be carried from it above the roof.

At the opposite end of the building there is a quarter over an imperfectly ventilated watercloset, which is said to cause fever among the occupants of the room. This defect requires remedy.

6.—ST. PETER'S LOWER COUNTERGUARD (LASCARIS).

This work was constructed in 1857–1858, and was occupied in 1859. It is situated at the south-eastern angle of Valetta, and rises about 150 feet above the harbour. It is, as it were, built against the high rock which rises to some elevation behind it. This circumstance, together with the fact that part of the work is cut out of the rock, renders the whole of it more or less damp from percolation of moisture through the soft porous sandstone from the higher elevations above it.

The work is an irregular polygon in form, containing an area of 4,105 square yards within the crest of the parapet, and exposing a large external surface in proportion to its area. The barrack accommodation is constructed on two levels. On the upper level are the officers' quarters and 10 casemated barrack rooms. On the lower level are eight barrack rooms, under those of the upper level, and also the ablution room, cook-house, women's wash-house, privies, canteen, &c. The upper rooms are entered directly from the open court of the upper level, but the lower level rooms open out of a sunk area below the upper level. Six of them are reached by a narrow passage about 7 feet wide, one side of which is formed by the ends of the rooms where the doors are, and the other side by a dead wall higher than the rooms themselves. This narrow cleft, which is crossed by arches giving access to the upper rooms, is the only source of light and ventilation on that side. The remaining two rooms open on a small sunk court.

The following table gives the details of the men's accommodation:—

Total Number of Rooms, 18.
Total Regulation Number of Non-commissioned Officers and Men, 269.

Barrack Rooms.	Regulation Number of Men in each Room.	Dimensions of Rooms.			Cubic Feet per Man.	Superficial Area in Ft. per Man of Floor Space.	Windows.		
		Length.	Breadth.	Height.			No.	Height.	Width.
No.		Ft. in.	Ft. in.	Ft. in.				Ft. in.	Ft. in.
1	14	29 0	20 0	5 2 10 10	598	41½	1	3 0	3 0
							2	5 6	3 8
							1	4 2	1 3
2	14	29 0	20 0	5 2 10 10	598	41½	1	3 0	3 0
							2	5 6	3 8
							1	4 2	1 3
3	14	29 0	20 0	5 2 10 10	598	41½	1	3 0	3 0
							2	5 6	3 8
							1	4 2	1 3

Barrack Rooms.	Regulation Number of Men in each Room.	Dimensions of Rooms.			Cubic Feet per Man.	Superficial Area in Ft. per Man of Floor Space.	Windows.		
		Length.	Breadth.	Height.			No.	Height.	Width.
No.		Ft. in.	Ft. in.	Ft. in.				Ft. in.	Ft. in.
4	14	29 0	20 0	5 2 10 10	598	41½	1 2 1	3 0 5 6 4 2	3 0 3 8 1 3
5	14	29 0	20 0	5 2 10 10	598	41½	1 2 1	3 0 5 6 4 2	3 0 3 8 1 3
6	14	29 0	20 0	5 2 10 10	598	41½	1 2 1	3 0 5 6 4 2	3 0 3 8 1 3
7	20	46 6 12 3 12 0	21 2 9 7 4 8	6 0 10 9	822	57½	2 1 1	3 3 3 6 4 2	3 3 3 2 1 3
8	14	29 0	20 0	5 2 10 10	598	41½	1 2 1	3 0 5 6 4 2	3 0 3 8 1 3
9	14	29 0	20 0	5 2 10 10	598	41½	1 2 1	3 0 5 6 4 2	3 0 3 8 1 3
10	19	40 0 12 0	20 0 6 4	5 4 10 9	703	46	2 1	3 3 4 2	3 0 1 3
11	13	25 0	19 0	5 4 11 3	548	36½	2 1	5 6 4 2	3 8 1 3
12	14	25 0	19 0	5 4 11 3	509	34	2 1	5 6 4 2	3 8 1 3
13	14	25 0	19 0	5 4 11 3	509	34	2 1	5 6 4 2	3 8 1 3
14	14	20 0	19 0	5 4 11 3	407	27	2 1	5 6 4 2	3 8 1 3
15	14	20 0	19 0	5 4 11 3	407	27	2 1	5 6 4 2	3 8 1 3
16	14	20 0	19 0	5 4 11 3	407	27	2 1	5 6 4 2	3 8 1 3
17	14	20 0	19 0	5 4 11 3	407	27	2 1	5 6 4 2	3 8 1 3
18	21	48 8 13 8 12 0	21 0 12 3 6 8	6 0 10 9	873	60	2 1 1	3 0 4 2 3 6	3 0 1 3 3 2
Guard Room -	4	25 0	19 0	9 0 13 0	2,365	119	1 1 1	5 0 3 0 5 0	3 0 3 0 1 8
Prison Cells, 3	1	9 3	6 6	9 0 13 0	1,500	60	—	—	—

Overcrowding.—These data show a very considerable amount of overcrowding in nearly all the rooms, both as regards cubic contents and surface area. The smallest allowance of space per man in this work ought to be that in room No. 7, namely, about 800 cubic feet. The rooms opening out of the lower narrow passage (Nos. 11 to 17 inclusive) ought to be struck off the barrack accommodation.

The following table shows the result of these changes:—

Rooms.	Present Number of Men per Room.	Total Number of Men.	Proposed Number of Men per Room.	Total proposed Number of Men.	Deficiency of Accommodation in Men.
No.					
1 to 6	14	84	10	60	24
7	20	20	20	20	—
8 and 9	14	28	10	20	8
10	19	19	17	17	2
11 to 17	14	97	—	—	97
18	21	21	21	21	—
Total - -	—	269	—	138	131

Ventilation.—Being a purely defensible work, the amount of window space is very limited. Properly speaking there are no windows in the outer walls except embrasures and loopholes. It would be very desirable in these rooms to enlarge the loopholes into windows provided with loopholed iron shutters for defence purposes. In most of the rooms there is a window on each side the door, facing inwards to the levels. The rooms generally are deficient in light from this circumstance. Seven of the rooms on the lower level have only three loopholes each to the outer air in the ends opposite the doors.

There are ventilating openings under the top of the arches in each at the opposite ends, showing that attention has been paid to this subject, but the means of ventilation are still deficient, and from the construction of the work it will be difficult to improve them.

The two floors of rooms differ materially in their relations to the health of the troops. The rooms on the upper floor are much dryer (except the officers' quarters), and when the stone floors are washed they become dry very soon. These upper rooms are also the best ventilated and the most healthy. The lower rooms on the contrary require a whole day to dry, marking their very defective ventilation, as well as their bad local position, and experience has proved them to be very unhealthy from rheumatism and fever. These rooms were unoccupied when we were there, mainly from their unhealthiness.

Warming and Lighting.—There are no fireplaces. Small oil lamps are used for lighting the rooms at night, but the oil ration lasts only three days, and the men have to buy candles for the rest of the week. Gas could be had.

Ablution and Bath Accommodation.—An ablution room has been formed out of one of the lower casemates. It has soft stone benches for holding basins. Water has to be carried from a pump in the small yard outside, and the foul water is poured down a grating in the middle of the floor. There are no baths.

Cook-house.—The cook-house is also in one of the lower casemates. It has six boilers of the old pattern, and an oven, the latter of no use because the opening is too narrow for the baking pans. Water for cooking has to be carried, and refuse water is poured down a grating in the floor, or it is carried to the privy.

Wash-house.—There is a wash-house for linen in another casemate, fitted with a boiler, five small Maltese stoves and a fireplace. It is considered sufficient, but there is no place for drying linen.

Latrines.—These are in casemates opening out of the lower level. They are of the usual Maltese construction, but have separate divisions and seats. Water is not laid on, but is poured down every morning.

Drainage.—The main drain of the barrack proceeds direct from the latrines down to the sea, and all the other drains are said to be connected with it. The drainage generally, at least as far as concerns the outlet, is said to be sufficient, but from want of a very simple precaution the rain-water from the upper level instead of being carried away independently, runs down into the narrow passage in front of the lower rooms, and so increases their dampness.

Water Supply.—Water is derived from rain-fall, which is conducted into underground tanks, and raised for use by pumps.

There is a large ashpit in a corner of the lower level. It is said to be emptied daily. An ashpit in such a confined locality is a most unnecessary risk to health, and should be removed. An iron box should be substituted for this ashpit.

Married Quarters.—None ; but certain unoccupied barrack rooms have been from time to time allotted for this class of accommodation.

Canteen.—The canteen is kept in the end casemate of the narrow passage already referred to, in a barrack room, quite unfit for occupation by soldiers. It is dark and damp, but no better accommodation is available in the work.

Guard Room and Cells.—The guard-room is situated in a corner of a small entrance court, and has door and windows at one end. The cells open out of a passage at the end of the guard room, opposite the door. They are of the usual construction and of large size, affording 1,500 cubic feet for each inmate.

Sanitary Improvements required.—This work, although of recent construction, shows great disregard of the application of healthy principles to this class of barrack accommodation. Part of it is quite unfit for human habitation, and the remainder does not admit of much improvement. We would recommend as follows :—

1. The unhealthy rooms in the lower tier to be struck off the list of barrack accommodation. The number of men in the other rooms to be reduced, to give at least 800 cubic feet per man.

2. Inlets for fresh air to be provided close to the top of the arch at each end of the rooms. The loopholes to be enlarged into windows, provided with iron shutters for defensive purposes.

3. Gas to be introduced.

4. Ablution room to have water laid on.
5. Oven of cook-house to have the door enlarged, and the new steel boilers to be introduced.
6. Latrines to be reconstructed on Macfarlane's or Jennings' principle, and to have water laid on.
7. Drainage of upper level to be improved, to prevent rain-water running down to lower level.
8. Ashpit to be abolished and an iron box substituted for it.

7.—FORT RICASOLI.

This is a large fort, covering a long projecting point of rock bounding the Grand Harbour on the eastern side towards the sea. It covers an area of about 18½ acres, the subsoil is soft Maltese stone, and the parade ground is about 40 feet above the sea level. The fort is isolated from all higher land, and its walls are washed by the sea for three-fourths of their circuit. So far as local position is concerned it ought to be very healthy. Occasionally there is nuisance from seaweed and other refuse which drifts into an adjacent creek, but no injury to health has been traced to this cause.

The barrack accommodation consists of two distinct parts, differing very much in construction. The principal barrack rooms are long casemates under the main land defences, on the east side of the fort. They have the arches supported towards the front by counterforts arched at the top, and about 9 feet deep. Each counterfort forms a deep narrow recess, at the upper end of which is a small window giving light to the casemate behind. Each long casemate has thus a range of windows along one of its sides at the spring of the arch, and the other side is formed by the dead wall of the defences. The lower part of each recess of the counterfort outside is formed into a very small room opening from the outer air, fitted up for married soldiers. They are very inadequate for such a purpose.

There are six long casemated rooms; four of them are arranged two and two, with a passage between them, from which a staircase gives access to some smaller rooms above and behind, very deficient both in light and ventilation, imbedded as it were in the works.

The principal rooms, although defective in window space and in ventilation, are the best part of the barracks.

The rooms in the other portion are of a different construction. They consist of a series of small casemates in the long wall bounding the south-western side of the fort. They are arranged two and two, one large and one small room side by side, with a doorway between them. They have the appearance of being in a bad state of repair. The floors irregular and below the level of the ground outside. Each casemate has a window over the door or at the side of the door, but there is a considerable space above the top of the window without any means of ventilation, in the majority of rooms. These rooms have proved unhealthy at times, partly on account of overcrowding, partly because the air in them is rendered stagnant by a long high wall carried in front of the doors and windows at a few feet only from the rooms. This wall is intended to screen the casemates from the officers' quarters which extend in a single line parallel with the wall, and at a few yards from it. Each officer's quarter has a small courtyard, between which and the parade ground there is another high wall cutting off the sea breeze from the quarters. The practical result of this effective blockade of the atmosphere from the men's rooms is that the air in and about them is stagnant, except during high winds.

Part of the men's rooms in this line are at a lower level, and are partially cut out of the rock.

The following table gives the details of each room:—

Date of Construction, time of the Knights.
Total Number of Rooms, 64.
Total Regulation Number of Men, 412.

Barrack Rooms.	Regulation Number of Men in each Room.	Dimensions of Rooms.			Cubic Feet per Man.	Superficial Area in Ft. per Man of Floor Space.	Windows.		
		Length.	Breadth.	Height.			No.	Height.	Width.
No.		Ft. in.	Ft. in.	Ft. in.				Ft. in.	Ft. in.
1	40	79 9	22 6	6 0 19 1	608	44	4	6 6	3 0
2	51	96 1	22 5	6 0 19 1	612	42	6	6 6	3 0
4	13	36 3	15 9	7 10 15 0	620	44	1	2 3	5 3

Barrack Rooms.	Regulation Number of Men in each Room.	Dimensions of Rooms.			Cubic Feet per Man.	Superficial Area in Ft. per Man of Floor Space.	Windows.		
		Length.	Breadth.	Height.			No.	Height.	Width.
No.		Ft. in.	Ft. in.	Ft. in.				Ft. in.	Ft. in.
5	60	113 10	22 4	6 0 18 1	647	42	6	6 6	3 0
6	63	117 0	22 4	6 0 18 1	597	41	6	6 6	3 0
7	9	20 8	20 10	9 10 10 3	637	44	1 2	9 0 1·10	4 2 4 2
8	7	17 5	16 1	9 10 10 3	576	40			
9	6	17 3	15 1	9 10 10 3	595	41			
10	9	20 7	20 5	9 10 10 3	637	43			
11	61	119 4	22 4	6 3 19 4	600	44	7	6 6	3 0
12	53	105 0	15 11	6 0 18 9	597	33	6	6 6	3 0
17 to 22	Serjeants, 6	11 5	9 7	9 0	900	110	1	1 9	1 3
23 to 34	Serjeants, 12	11 5	9 7	9 0	900	110	1	1 9	1 3
35 to 44	Married people, 5	11 5	9 7	9 0	1,800	110	1	1 9	1 3
45 to 52	7	17 8 17 7	8 8 15 7	4 11 10 6	624	52	1 1	4 9 3 0	2 11 2 11
Staff Serjeant	Staff Serjeant, 1	17 8 17 7	8 8 15 7	4 11 10 6	4,370	308	1 1	3 3 3 0	3 0 3 11
55	7	17 8 17 7	8 8 15 7	4 11 10 6	624	44	1 1	2 9 2 9	3 5 2 5
56	5	17 8 17 7	8 8 15 7	4 11 10 6	616	44	1	3 8	3 11
57	6	17 8 17 7	8 8 15 7	4 11 10 6	634	51	1	3 6	2 7
58 to 63	9	17 8 17 7	8 8 15 7	4 11 10 6	618	35	1 1	3 8 3 6	2 11 2 7
64	6	17 8 17 7	8 8 15 7	4 11 10 6	601	51	1	3 6	3 5
65	Staff Serjeant, 1	17 8 17 7	8 8 15 7	4 11 10 6	4,680	308	1	4 1	2 2
66	Married people, 1	17 8 17 7	8 8 15 7	4 11 10 6	3,560	- -	1	4 1	2 2
66A	Married people, 1	17 8 17 7	8 8 15 7	4 11 10 6	1,760	- -	1	3 0	3 0
67	Married people, 1	17 8 17 7	8 8 15 7	4 11 10 6	6,000	- -	1	4 1	2 2
Guard Room	1	34 10	21 4	10 3 11 6	—	—	—	—	—
Prison Cells	1	17 4	10 5	5 0 11 0	—	—	—	—	—
	5	17 4	7 7	5 0 11 0	—	—	—	—	—

Overcrowding.—The casemates of Fort Ricasoli vary in height from 15 feet to 25 feet, one result of which is that although the cubic space per man varies from 595 to 647 feet, there is very considerable surface overcrowding. One room for 53 men gives only 33 square feet per man. From 40 to 44 square feet is the usual amount.

The small superficial area indicates that about a third of the men ought at all ordinary times to be removed out of the rooms; a measure which would improve materially the health of the troops, but it would reduce the available accommodation from 412 to 300 men.

Ventilation.—The table shows that the window space in all the larger casemates is much too limited, and it would add materially to the cheerfulness, no less than to the healthiness of the rooms, to enlarge the windows very considerably. The small rooms for married soldiers in the recesses of the counterforts should be removed, and the casemate windows brought nearer the ground. The windows in the small casemates in the south-east wall should be raised. A range of married quarters should be built to supply the place of the small rooms in the counterforts which we propose to abolish. The ventilation is generally imperfect, and by no means sufficient to keep the air pure. In the large casemates shafts should be carried up at intervals through the crown of the arch, and up through the terre-plein of the battery above, and inlets as high up in the sides of the rooms as possible. In the smaller range of casemates along the south-eastern wall, a shaft should be carried up from the end of the casemate furthest from the door, and an inlet of sufficient size placed in the front directly under the arch.

Warming and Lighting.—There are no fireplaces. Lighting is done by small oil lamps. There is no gas available.

Ablution and Bath Accommodation.—The ablution accommodation is very imperfect in kind and amount. The only room at present provided is one of the casemates in the south-western wall at a considerable distance from most of the barrack accommodation. Such as it is, it requires improvement, and another and more convenient room is also needed for the other side of the fort. There are no baths. The ablution room is inconvenient and seldom used.

Cook-house.—There is a large cook-house situated in one of the angles of the works, in a casemate through which access is obtained to the terre-plein above. As the passages are all open the ventilation is abundant, and the kitchen quite cool. This cook-house is provided with boilers of the old pattern, but has no oven. It has no water supply.

Latrines and Urinals.—The latrines are situated on the northern face of the fort at about 50 yards from the nearest barrack room. Those for men and for women are close to each other. They are of the usual construction, and are flushed. They are in an underground casemate and are ventilated by a large opening in the top of the arch. The men's urinal is close to the women's privy, and there is also a cook-house for married people in the same locality. Close at hand is a place used for throwing down foul water, in a very offensive condition.

Drainage.—Connected with this part of the subject is that of the general drainage of the barrack. The main drains are 2 feet 6 inches wide by 5 feet high, and are cut out of the solid rock. There are branch drains from the cook-house, privies, &c., 1 foot wide by 1 foot 6 inches high. The mains have outlets into the sea on both sides of the fort, one of which, that to the north, has been a cause of great complaint on account of nuisance. The soil from the latrines is flushed through this outlet, which opens on the surface of the rock above the sea level, forming at times a large pool of foul water, from which the most offensive effluvia proceed. A cutting in the rock has been made with the view of remedying the evil, but with little success. It is stated that the summer before last, the barrack room nearest this nuisance became very unhealthy. The drainage from latrines, cook-houses, and ablution rooms should be carried away by means of glazed pipe drains not more than nine inches in diameter, and discharged into the sea by iron pipes or by covered drains cut in the rock and discharging below the sea level. The whole case belongs to the general subject of outlets which we have elsewhere considered.

During summer no fewer than 60 men are employed daily in carrying water to flush the drains; a fact quite sufficient to prove their need of reconstruction on better principles.

Water Supply.—Water for the fort is derived from rain-fall collected in underground tanks. Three of the principal ones had lost their water, but two had been repaired. At the time we were there, water for drinking and cooking had to be supplied by the Commissariat, and was stored in open barrels on the barrack-ground, exposed to dust and to the heat of the sun. One of the tanks yields brackish water occasionally in stormy weather. When all the tanks are repaired, the water supply will, it is stated, be sufficient as to amount, but the manner of distribution requires to be altered. In order to economize the fresh water it would be desirable to supply the latrines with salt or brackish water, pumped from the sea into a cast iron tank conveniently placed. At Fort Ricasoli a windmill for pumping might be used.

Library and Reading Room.—The library is formed out of three contiguous rooms in the south-western range of casemates, all communicating with each other. The reading room is in a similar casemate. They are all lighted and ventilated, and a shed has been constructed outside for the men to sit under and smoke.

Canteen.—The canteen accommodation is dark and very uninviting. It consists of two rooms and a yard in front. It requires very considerable improvement.

Guard Room and Cells.—The guard room is on one side of the entrance gate. It has ventilation, but requires more window space. There is no lock-up. There are six cells, one or two of which are very bad. Ventilation by shafts and inlets is required; but it would be better to reconstruct the cells.

Schoolroom.—This room is on the side of the entrance gateway opposite the guard room. It is well lighted, and appears to have been efficiently ventilated recently.

Workshops.—None. Barrack rooms are used instead.

There is no ball court or skittle alley.

Sanitary Improvements required.—1. Reducing the number of men to afford a larger amount of surface area per man, especially in the casemates along the south-eastern wall, and providing accommodation for married soldiers in new quarters to be built for them, with wash-house and ablution room for women and children.

2. Ventilating all the casemates, as in Plan XI., and giving more window space in the manner described.

3. Suitable ablution rooms, with baths and water laid on, to be provided, Plans XV., XVI., XVII.

4. Latrines and urinals to be reconstructed on Macfarlane's or Jennings' principle, properly drained and supplied with water, Plans XII., XIII., XIV.

5. Drains from the latrines, ablution rooms, and cook-houses to be reconstructed, with means of flushing, and a proper outlet to be made into the sea.

6. Fresh water supply to be improved, and laid on for use. Salt or brackish water to be provided for the latrines.

7. Guard-room to have more window space; cells to be reconstructed; canteen to be improved.

8. Ball court to be provided.

9 Cook-houses to have the new steel boilers and ovens introduced, Plan XVIII.

8.—Fort St. Salvatore.

This is a small fort situated near the north-eastern angle of the Cotonera lines, for the protection of a gate. It consists of a curtain and salients, and occupies an area of about 11,000 square yards. The surface and subsoil consists of soft sandstone. The site is elevated, and ought to be healthy.

There are two sets of barrack rooms, one consisting of short casemates in the curtain, the other of long casemates in the salients. Besides these there are several large and lofty casemates outside the fort and over the adjacent gate at present used as stores, but which might be advantageously added to the barrack accommodation.

The officers' quarters are in small casemates, with fireplaces, similar to those occupied by the men.

The following table gives the statistics of accommodation:—

Date of Construction, time of the Knights.
Total Number of Rooms, 11.
Total Regulation Number of Non-commissioned Officers and Men, 132.

Barrack Rooms.	Regulation Number of Men in each Room.	Dimensions of Rooms.			Cubic Feet per Man.	Superficial Area in Ft. per Man of Floor Space.	Windows.		
		Length.	Breadth.	Height.			No.	Height.	Width.
No.		Ft. in.	Ft. in.	Ft. in.				Ft. in.	Ft. in.
1	19	79 11	19 3	7 2 6 4	584	79	1	6 3	5 2
4 and 5	6	20 4	15 11	10 7	682	63	1 1	4 4 1 8	3 6 3 6
6 and 7	6	20 4	15 11	8 10 1 2	682	63	1 1	4 4 1 8	3 6 3 6
8 and 9	7	20 4	15 11	8 10 1 2	585	45	1 1	4 4 1 8	3 6 3 6
10	19	79 11	19 3	7 2 6 4	584	79	1	6 3	5 2
11 and 12	19	33 5 46 0	19 0 19 1	7 10 7 4	626	79	Nil.	—	—
1A	56	- -	- -	- -	600	- -	3 2	7 0 7 0	4 3 5 3
Guard Room	1	21 6	12 11	4 1 8 11	—	—	—	—	—
Prison Cells	2	12 7	7 7	12 10	—	—	—	—	—

Overcrowding.—According to the table the regulation space per man varies from 584 to 682 cubic feet; and the surface area, with the exception of one room, is much greater than in most other barracks in the island; but at the time of our inspection the numbers of men per room greatly exceeded those in the table. In one of the 19-men casemates, having a door and small window over it, and an embrasure at the end, there were no fewer than 40 men. In two of the 6-men rooms there were 20 men. In consequence of this departure from the regulation there was great overcrowding throughout the fort, and all the rooms were close and very imperfectly ventilated. The number of men per room shown in the preceding table should on no account be exceeded.

Ventilation.—In the long casemates there are openings in the arch above intended to act as inlets, but from their imperfect construction these openings cannot always be kept open; and when they are closed there is no ventilation worthy of the name. To remedy this defect shafts on Muir's principle, louvred above to prevent the rain beating in, should be carried up through the present openings. The smaller rooms are placed one over the other, and are connected by an inside stair. The lower floor has no ventilation except by the stair into the room above, and the outlets are in the arch of the upper room. This construction is radically defective, and the only way to remedy it is to carry up separate shafts of sufficient size from the rooms below.

In some of the larger rooms there are embrasures which have been closed; these should be reopened, and windows placed in them.

Lighting.—The barrack rooms are lighted by the usual small oil lamps. Gas is not available.

Ablution and Bath Accommodation.—There is an ablution shed built against the counterscarp of the ditch, close to the cook-house and latrines. It is not supplied with water, which has to be carried from a pump in the fort. The accommodation is of the usual kind, namely, a stone bench along the wall, on which to place the basins. There are no baths. Water should be laid on from a pump to a cistern in the ablution room, and slate slabs with basins sunk in them and a bath should be provided. The ablution shed is occasionally used as a women's wash-house.

Cook-house.—The cook-house has three boilers of the ordinary pattern, and an oven. It requires ventilation in the roof.

Latrine.—This convenience is over a cesspit, which is emptied by contract. The place is very offensive. The officers' watercloset appears to be seldom supplied with water.

Drainage.—The drainage of this fort is imperfectly known. The drains are carried through the works to the sea. One of the drains was very offensive.

Water Supply.—All the water is derived from rainfall, and is stored in tanks within the fort. Arrangements should be made for catching as much additional rain water as possible.

Guard Room.—The guard room is opposite the entrance. It has a door and window, and a small window over the door. It has a moveable sash, but requires hinges to enable it to be opened. There are two cells; each has a window at the back, but they require one in front also. The passage leading to the cells requires ventilation.

Married Quarters.—These are situated in fortini, in an adjacent curtain; they are not very good. But the accommodation would be more suitable if two adjacent fortini were given over to each family, and if a small wash-house with two boilers and two or three tubs were provided.

Sanitary Improvements required.—The chief defects in Fort St. Salvatore are great overcrowding above the regulation, deficient ventilation, and defective drainage.

The regulation number of men is the largest number which should ever be allowed in the rooms, and in rooms 8 and 9 the numbers should be reduced to six men per room. All the casemates should be freely ventilated, the existing outlets should be properly louvred, and additional outlet shafts on Muir's principle provided. Additional windows and inlets should be placed wherever there is room for them. Officers' quarters should be built, and their present quarters given over for men's accommodation, proper ventilation by shafts and inlets being at the same time introduced into them. The stores not otherwise required should be converted into men's quarters, the drainage should be thoroughly examined and repaired, the latrines drained and reconstructed. If sufficient water can be obtained the privies should be converted into water latrines; if not, iron boxes emptied daily should be used instead. The ablution room and cook-house should be improved, steel boilers and oven introduced, and the guard-room and cells better ventilated.

9.—Fort St. Angelo.

This fort occupies the summit and sides of a rocky promontory forming the western point of the peninsula on which Vittoriosa is situated. It projects into the middle of the Grand harbour, and is nearly surrounded by water. The position is a very healthy one, and fully exposed to the sea breeze. On account of the irregular form of the rock the barracks are at different elevations, and have been constructed wherever space could be most conveniently found, without much regard to regularity of plan. The different ranges are connected by narrow ramps and steps, and all the rooms are small, with space for a very few men in each. The area within the walls is about 25,000 square yards, and the surface and subsoil consist of porous sandstone rock. There is one principal range of soldiers' rooms (1 to 7) containing 14 small apartments connected two and two by a door through the wall. Each pair of rooms opens from an enclosed court in front, from which a small space intended for cooking is walled off. The front walls of these courts are as high as the rooms. The courts are quite unnecessary and useless, while the walls and cross walls interfere most injuriously with the ventilation of the rooms, and should therefore be removed. There are similar walls in front of other rooms in the other blocks, which should also be taken down.

Some of the rooms are on two floors, and are reached at two levels. The lower rooms are built against the rock, and have doors and windows only in front, while the rooms above have doors and windows on opposite sides. The rooms are rather crowded, as in the majority of instances they afford considerably under 600 cubic feet per man.

The following table gives the statistics of the barrack accommodation:—

Date of Construction, time of the Knights.
Total Number of Rooms, 16.
Total Regulation Number of Men, 118.

Barrack Rooms.	Regulation Number of Men in each Room.	Dimensions of Rooms.			Cubic Feet per Man.	Superficial Area in Ft. per Man of Floor Space.	Windows.		
		Length.	Breadth.	Height.			No.	Height.	Width.
No.		Ft. in.	Ft. in.	Ft. in.				Ft. in.	Ft. in.
1	8	14 0 12 11	13 0 8 9	5 8 10 4	520	37	2	3 3	2 3
2	8	14 0 12 11	13 0 8 9	5 8 10 4	520	37	2	3 3	2 3
3	8	13 0 12 11	12 11 8 8	5 8 10 4	511	35	2	3 3	2 3
4	8	13 1 13 0	12 11 8 8	5 8 10 4	516	35	2	3 3	2 3
5	8	13 1 13 0	12 11 8 8	5 8 10 4	516	35	2	3 3	2 3
6	8	12 11 12 10	13 2 8 7	5 8 9 8	619	43	2	3 3	2 3
8	7	12 11 13 0	13 1 8 8	5 8 9 8	545	35	2	3 3	2 3
9	7	12 11 13 0	13 1 8 8	5 8 9 8	545	35	2	3 3	2 3
10	1 Staff Sergeant	13 0 13 0	12 0 7 9	4 3 9 7	3,501	257	2	3 3	2 3
11	1 Married Serjeant	13 0	13 0	4 3 9 7	2,329	169	1 1	3 3 1 9	2 3 1 5
12	7	17 4	15 0	6 0 10 10	609	37	2	3 3	2 3
13	10	14 0 13 8	13 2 13 10	6 6 10 10	587	37	2	3 3	2 3
14	9	12 10 12 9	13 0 13 9	6 6 10 2	569	35	2	3 3	2 3
15	10	13 6 15 3	13 0 14 0	6 6 10 2	542	37	2	3 3	2 3
16	10	12 10 13 0	13 9 12 6	6 1 8 9	527	35	2	3 3	2 3
17	10	13 0 13 3	13 9 13 0	6 4 10 4	535	35	2	3 3	2 3
Guard Room	1	37 0	19 1	9 6 15 0	—	—	—	—	—

Overcrowding.—The rooms differ in character. Some are better than others, but all of them would be more adapted, from their construction, for married quarters than for barrack rooms. Generally they have not sufficient space for tables, &c., and the tables are placed in the small courts in front. The superficial area per man is much too small, but, on the other hand, the position is exposed to every healthy wind, the barrack is only a small one, and the quarters are not all in the same block, so that there is better external ventilation. Any way there is not convenient accommodation for more than about two-thirds of the present regulation number, or for about 80 men.

Ventilation.—The only means of ventilation are the doors and one or two small windows, except in the rooms built against the rock; and as these rooms have no window behind, a large shaft has been carried up from the top of the arch opposite the door, intended to act as an outlet. These shafts open on the passage leading to the upper rooms, close to their doors. It would improve the ventilation of all the rooms to enlarge the windows, and to provide them with proper sashes, instead of the boards which are used for many of them at present.

Permanent ventilating arrangements are also necessary. As long as the present windows and doors are kept open the air is fresh enough, but when they are closed the air becomes very foul. The only way to avoid this is to provide each room with properly constructed shafts and inlets.

Warming and Lighting.—There are no fireplaces. This defect is common to nearly all the barrack rooms in the garrison. If provided they would not only enable the rooms to be kept free of damp in moist weather, but they would be advantageous to the room ventilation at all other times.

Lighting is done by small lamps supplied with an insufficient oil ration; and the men are obliged to buy candles after the ration is consumed.

Ablution and Bath Accommodation.—There is a small ablution room, with washing troughs of stone against the walls on two of its sides. These troughs have holes to allow the water to escape, and plugs. There is no water laid on. The arrangements are very defective, and ought to be replaced by slate tables with sunk basins and water laid on. There are no baths.

Cook-house.—The cook-house consists of a small arched room with no opening except the door. It has four ordinary pattern boilers, and a stone oven for burning wood. These should be changed for improved steel boilers and oven. The cook-house should have a drained sink with water laid on. At present water has to be carried from the pump, and refuse water is thrown down a drain outside.

Wash-house.—All the washing for the fort has to be done in a small, irregularly shaped, dull room, without any conveniences for the purpose. Two small boilers with a few fixed washing troughs should be provided.

Latrines and Drainage.—The latrines are situated in the end compartment of the court, in front of No. 7 room, and in contact with its wall. The place is insufficiently ventilated. The latrines are of the usual construction, and require the same improvements as the others. The main drain of the fort runs direct from the privy to the sea, and all the other drains are connected with it. One of these was in a very offensive state, and tainted the air to some distance. The latrines, ablution room, cook-house, &c., should be drained to the sea by glazed earthenware pipes.

The whole drainage requires to be examined and rectified.

There is an offensive ashpit at one end of the main range of barracks, which ought to be entirely removed, and an iron box supplied instead, and provision made for daily carrying away the refuse.

Water Supply.—The water supply is all derived from rain-fall stored in tanks. No other source is available. The latrines, when reconstructed, should be supplied with salt water by a pump, and flushed out sufficiently often to keep them free of offensive odour.

Guard Room.—This is a casemate at the entrance gate. The lock-up is merely a bunk taken off it. There is no ventilation.

Married Quarters.—There are none specially appropriated, but several small soldiers' rooms are set apart for married people. The mess kitchen was also occupied by married people.

Officers' Quarters.—The officers' quarters occupy the highest ground in the fort. They have several small gardens attached to them, and are generally good.

Sanitary Improvements.—The chief improvements required for this fort are, as will be seen, diminution of overcrowding, improved ventilation, water supply and drainage, and improved accommodation as to latrines, ablution rooms, cook-house, and wash-house, in the manner already mentioned. To effect the necessary diminution of overcrowding, it will be requisite to build quarters for 40 men on the best available site. Part of the garden of the upper fort would be a good place if it could be spared.

10.—VERDALA BARRACKS.

These barracks constitute a large work at the upper end of a steep slope rising from the top of Dockyard Creek towards the inner line of works at Burmola. The slope of the hill below is densely covered with a poor crowded class of dwellings coming close up to the barracks, and the works beyond rise above the level of the barracks, so that they cannot be said to be advantageously situated for free external ventilation.

Fort Verdala was built in 1853, and, notwithstanding some defects, it is one of the best barracks in Malta. The general outline of the plan is that of a curtain with salients. The public gate passes through the centre of the curtain. Seen from the outside, the barracks have the appearance of a loopholed fort, and it is only from the interior of the fort that their construction becomes visible.

They consist of a series of casemated rooms all of the same size, and in two floors. In front of the lower floor there is an arched covered verandah, 5 feet 2 inches wide, above which is an open terrace 6 feet 3 inches wide, reached by stairs at the corners, and affording means of access to the rooms on the upper floor. The ends of the room arches are towards these terraces, and have a door and one window, and in some instances two windows, to the open air. At the end of the arch opposite the door are three loop-holes.

The parade ground enclosed among the barrack ranges is irregular in shape, following in this respect the outline of the fort. Opposite the curtain it is a long narrow strip of ground. In one of the salients it is nearly triangular in form, and in the other salient it consists of two irregular squares, chiefly occupied by officers' quarters. The parade ground is completely enclosed by walls or by higher levels, and its form is not well adapted for securing free ventilation. The total area within the fort, including the space covered by buildings, is 4⅓ acres. The subsoil is sandstone rock.

The following table gives the statistics of the accommodation:—

Total Number of Rooms, 90.
Total Regulation Number of Men, 690.

Barrack Rooms.	Regulation Number of Men in each Room.	Dimensions of Rooms.			Cubic Feet per Man.	Superficial Area in Ft. per Man of Floor Space.	Windows.		
		Length.	Breadth.	Height.			No.	Height.	Width.
No.		Ft. in.	Ft. in.	Ft. in.				Ft. in.	Ft. in.
1, 2, 3, 4, 5, 6, 7, 12, 13, 14, 15, 16, 20, 21, 22, 23, 24, 25, 29, 30, 31, 32	10	24 0	17 6	5 0 9 0	489	42	2 3	4 10 1 3	3 2 0 3
8	1 Staff Serjeant	24 0	17 6	5 0 9 0	4,896	420	2 3	4 10 1 3	3 2 0 3
33, 34, 35, 36, 37, 38, 39, 40	10	24 0	17 6	5 0 9 0	489	42	1 3	6 3 1 3	5 2 0 3
42	Serjeant-Major	24 0	17 6	5 0 9 0	4,896	420	1 3	6 3 1 3	5 2 0 3
45	Quartermaster-Serjeant	24 0	17 6	5 0 9 0	4,896	420	1 3	6 3 1 3	5 2 0 3
46, 47, 48, & 49	2nd Class Staff-Serjeant	24 0	17 6	5 0 9 0	4,896	420	1 3	6 3 1 3	5 2 0 3
51, 52, 53, 54, 55, 56, 57, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 71, 72, 73, 74, 75, 76, 77, 80, 81, 82, 83	10	24 0	17 6	5 0 9 0	489	42	1 3	6 1 1 3	2 11 0 3
84, 85, 86, 87, 88, 89, 93	10	24 0	17 6	5 0 9 0	489	42	1 3	6 1 1 3	2 11 0 3
90, 91, 92, & 94	10	24 0	17 6	5 0 9 0	489	42	1 3	6 3 1 3	5 2 0 3
1 to 10	Officers' servants, 2	24 0	17 6	5 0 9 0	2,448	210	1 3	6 3 1 3	5 2 0 3
11, 12, & 13	Staff-Serjeant	24 0	17 6	5 0 9 0	4,896	420	1 3	6 3 1 3	5 2 0 3
F.O. servant -	F.O. servant	24 0	17 6	5 0 9 0	4,896	420	1 8	6 3 1 3	5 2 0 3
Guard Room	1	24 0	17 6	5 0 9 0	—	—	—	—	—
Prison Cells	2	10 0	6 4	5 0 9 0	—	—	—	—	—
	3	7 5	6 4	5 0 9 0	—	—	—	—	—

Overcrowding.—It will be observed that the rooms are no more than 17 feet 6 inches wide, leaving only a small space between the opposite beds; and when the beds are folded down the forms have to be placed on the top of the tables; so that the men have no means of reading, writing, &c., during the evening. The table also shows a very considerable degree of overcrowding in all the men's rooms, both in cubic space and superficial area, even at the regulation number of 10 men per room; but when the return was made up the actual number was 12 men per room, a degree of overcrowding seldom reached even at home. It is easy to understand why the troops in this barrack have suffered from fever; and it is certain to recur, unless the overcrowding is diminished. There should be no more than 8 men per room, at the very most, to give anything like adequate space for the inmates.

The effect of this reduction on the accommodation would be as follows :—

Rooms.	Present Number of Men per Room.	Total Number of Men.	Proposed Number of Men per Room.	Total Number of Men.	Deficiency of Accommodation in Men.
No. 69	10	690	8	552	138

Ventilation.—Besides the doors, windows, and loopholes, every room has a foul-air shaft carried up in the back wall, having an area of 2 feet by 16 inches, and an opening over the door 13 inches long by 6 inches wide. These means are, however, insufficient to preserve the requisite purity of the air at night with the present number of occupants. The inlet should be enlarged, and furnished with louvres arranged to throw the air-current up to the roof of the room. There is, besides, a shutter over the shaft capable of being closed, and which no doubt is almost always closed. This shutter should be removed, and the lower end of the shaft louvred so as to throw any down-draught towards the ceiling. The windows are circular headed, and although they are made to take out, the circular heads are not hinged so as to open without being removed. These improvements would add materially to the facilities for ventilation, but no permanent good will be done in this respect so long as the overcrowding continues.

It would be an additional improvement in these barracks to introduce windows in place of loopholes, the windows to be provided with loopholed iron shutters, which could be closed for defence when necessary. Iron shutters would resist shot as effectually as the soft friable Maltese stone; and the introduction of windows would improve the salubrity of the rooms.

Ablution and Bath Accommodation.—There are, three ablution rooms, exactly like barrack rooms having a stone bench down one side, and metal basins. Water is not laid on, but has to be carried by a fatigue party. A board which sat recently, recommended one of these rooms to be converted into a barrack room. There are no baths, and the existing means of cleanliness are not sufficient.

Cook-houses.—These are two in number, and are of the same size as the barrack rooms. Each cook-house has 16 boilers, of the old pattern, but no oven. The rooms are not adapted for cook-houses, on account of its being impossible to ventilate them sufficiently; and the mens' rooms above them cannot be used as barrack rooms on account of the high temperature. Water is not laid on, but has to be carried. Refuse water is poured down a drain in the floor.

Women's Wash-house.—This is also a room of the same size as the barrack rooms. It has washing benches and two boilers. The drying ground is on the rampart. The accommodation is stated to be insufficient for the strength in barracks.

The ablution rooms, cook-houses, and wash-house are quite out of place where they are. It would be much better to build them in some detached locality, as has been done with the latrines, and to convert the present rooms to other purposes. It is not safe in a barrack like this to have so much damp surface and heat among the barrack rooms.

Latrines and Urinals.—These are in a detached block by themselves; they are of the usual construction, but are not sufficiently ventilated. The urinals are of a clumsy form. The supply of water for the latrines is derived from a tank filled by a force-pump; but as the tank from which the supply is obtained is too small, water runs short, and it is necessary to employ fatigue parties to fill carts with salt water from the creek eight times daily to flush the latrines. This is a great evil, and ought to be remedied.

Drainage.—The barrack drainage is collected in two main sewers, the largest of which is 2 feet wide and no less than 10 feet high, cut in the solid rock and arched with stone. The drainage is finally discharged into the town sewers of Burmola, and thence into Dockyard creek, half a mile distant. All the openings into these drains are trapped. The surface drainage is sufficient except in very wet weather, when, from the gratings becoming choked with sand, the rain flows over the surface, and has to be swept away by fatigue parties. This defect should be remedied. One main drain passes under a barrack room. This should be altered. The surface drains are swept out three times a day, and any refuse is thrown into the ash-pit, from whence it is removed by the contractor every day. This ashpit should be abolished, and all refuse collected in an iron box, and removed by the contractor, as at present.

Water Supply.—The water supply is derived from two tanks within the barrack precincts. It is not sufficient in amount.

Stables.—The stables are in the square, and occupy the space of two soldiers' rooms, divided into 12 stalls; there are forage stores and pay office over them. The dung heap is close to the officers quarters; the manure is removed every alternate day. The stables are ventilated by four shafts carried up to the roof of the barrack. These stables are in a most objectionable position for the healthiness of the barracks. They should be removed and placed outside the fort.

Married Quarters.—None; except for two staff serjeants.

Officers' Quarters.—The officers' quarters are good, but not very light. They are ventilated in the same manner as the soldiers' rooms. The mess room is over the mess kitchen, and during the summer months the heat in the mess room is almost unendurable. The kitchen requires thorough roof ventilation to carry off the hot air. There are no quarters for the commanding officer, surgeon, quartermaster, and adjutant, who live at a distance, although constantly required in barracks. It is stated to be almost impossible to obtain decent lodgings in the neighbourhood. The commanding officer was living two miles, and the surgeon upwards of one mile away, because they could get no suitable accommodation nearer at hand.

Library, Reading Room, &c.—The only accommodation of this kind at present consists of two barrack rooms taken away from the men. Another room is used for an infant school. The tailors' and shoemakers' shops and the canteen are also in barrack rooms.

A fives-court has been recently constructed in the ditch.

Sanitary improvements required.—1. All the misappropriations to be restored to the barrack accommodation. The cook-rooms and ablution rooms to be placed in a detached building within the fort, but not in the square. The stables to be removed. A separate building for a reading and day room, with a coffee bar between them, to be erected outside, and if possible between the Cotonera and St. Marguerita lines, or, if not objectionable, in the ditch. The infant school and canteen to be removed to the same position. The rooms now occupied for these purposes to be restored to the barrack accommodation. Misappropriations for any purpose are indefensible while the men are crowded to such an extent as they are in these barracks. Every barrack room should have no more than eight men in it, instead of 12 the actual number. Married soldiers' quarters for the regulation number should be provided on the plan we have already described outside the fort. The infant school should be attached to them, and also a women's wash-house and an ablution room. Accommodation for sick women and children could be best provided in the manner already recommended.

2. Ventilation of men's rooms and officers' mess kitchen to be improved in the manner suggested above.

3. A new ablution and bath room to be provided, Plan XVII.

4. A new cook-house, light and well ventilated, to be built, and provided with a Benham's cooking apparatus, or else with the new steel boilers and oven, Plan XIX.

5. Women's wash-house, Plan IX, to be built at the proposed married quarters.

6. Latrines to be reconstructed on Macfarlane's or Jenning's principle, and supplied with sufficient water. Urinals to be improved, Plans XII., XIII., XIV.

7. Drainage to be revised, and glazed earthenware pipes used for sewers.

8. Ashpit to be abolished and iron box substituted.

9. Water supply to be increased. Lastly, plans should be prepared for providing the quarters and other accommodation at present deficient in a manner consistent with health.

11.—St. Elena Gate Barracks.

These barracks are built in a curtain on each side of the gate, about 500 yards from Fort Verdala. The ground at this point falls on both sides into a ravine, in the bottom of which the gate is situated; and the barrack rooms are, therefore, on different levels. There is an officers' quarter and six barrack rooms on each side the gate. The rooms are casemates, with the arches at right-angles to the curtain. They have each three windows in front; two of these are closed by shutters merely, and the other, which is near the roof, is arched. On account of the slope of the ground, the casemates vary in height. Those nearest the gate are very lofty, while those at the top of the slope are about 12 feet high. Each set of six rooms has only one entrance, and all the rooms communicate with the one where the entrance door is by flights of steps. These barracks form one side of a narrow densely peopled street, and are not well situated for external ventilation, while all the rooms on each side the gate communicate with each other. The construction and position are therefore both unfavourable.

Overcrowding.—The casemates are each 30 feet long by 18 feet wide. They differ in height from 12 feet to about double that height; and each is intended to hold 16 men. This gives about 34 square feet per man, with an effective cubic space of from 350 to about 500 feet.

The total accommodation is for 4 officers and 200 men. The place should not contain above 100 men. The rooms are stated to be generally damp.

Ventilation.—The means of ventilation provided are, the windows already mentioned, and a ventilating shaft at the back, carried up into the parapet: these means are far from being sufficient. The only remedy for this defect is to enlarge all the windows and glaze them, and to provide permanent louvred inlets for air at the top of the wall next the street, close to the crown of the arch. The new windows should all be made to open.

Ablution and Bath Accommodation.—There is no ablution room, and the men are said to wash in their rooms or in the street in front. There is no bath.

Cook-house.—The cook-house is in one of the upper casemates. It has boilers, but no oven. It is ventilated through the roof.

Latrines.—The latrines are of the usual construction, and are situated at the top of one of the slopes, higher up than the cook-house. The place requires more light and ventilation. There are urinals constructed of porous stone, and offensive.

Water Supply.—This is obtained from a tank at the gateway.

Sanitary Improvements required.—This is a bad barrack, and not much can be done to improve it. Each man should have from 65 to 70 square feet of surface. The windows should be enlarged and glazed, inlets for fresh air provided, as already described; an ablution and bath-room built, steel boilers and oven provided for the cook-house, and proper latrines supplied with water, and having more light and ventilation, should be constructed instead of the present defective arrangements.

12.—ZEITUN GATE BARRACK.

This is a small bad barrack for 41 men, situated in one of the curtains of the Cotonera lines. There are no buildings near it to interfere with the external ventilation, but otherwise it is hardly suitable for troops. It consists of three casemates; the centre one of which appears to have been intended for the gateway, although now a barrack room, with rooms over them for officers' quarters. The guard-room is part of the centre casemate, cut off by means of a partition.

The following table gives the accommodation:—

Rooms.	Number of Men per Room.	Dimensions.			Cubic Feet per Man.	Superficial Feet per Man.	Windows.		
		Length.	Breadth.	Height.			Number.	Height.	Width.
No.		Ft. in.	Ft. in.	Ft. in.				Ft. in.	Ft. in.
1	15	32 9	23 0	9 7 9 9	600	50	2	4 1	2 10
2	15	31 9	19 5	9 7 9 9	600	41	2	4 1	2 10
3	11	27 0	21 0	6 0 20 6	636	51	None.	—	—
Guard Room -	1	20 10	8 5	6 0 20 6	—	—	None.	—	—

Ventilation.—There are no means of ventilation properly so called. The centre casemate has no openings to the outer air except the door and the slits in the escarp originally intended for giving passage to the beams of the drawbridge. This room is still further darkened by the guard room, which is taken off it at the doorway. The other rooms have small windows over the door, but no other openings. All the rooms require more light and ventilation. The centre room should have a large window between the slits, and a shaft carried above the parapet. The other rooms also require shafts and larger windows. All the rooms should have permanent louvred inlets for the outer air near the crown of the arch.

Ablution and Bath Accommodation.—None.

Cook-house.—This is a small temporary building with two boilers. It has no means of ventilation except the door and window. Water has to be carried from a tank about 50 yards distant.

Latrines and Urinals.—The latrines are also of a temporary description. They are very bad and offensive, and have no drainage except into a cesspit. This arrangement was introduced in 1856, since which time the cesspit has not been cleansed. The urinals are of temporary construction likewise.

Drainage.—There is, properly speaking, no drainage. The surface and refuse water flows through a drain towards the foot of St. Clement's glacis, and empties itself into a large hollow space of ground about 250 yards from the barrack. Nothing can well be worse than such an arrangement. The drainage, such as it is, sometimes becomes choked after heavy rains.

To make this barrack what it ought to be would require a larger outlay of money than the place is worth. If it must be kept up, the rooms should all be better ventilated by louvred shafts and louvred inlets, and lighted by constructing windows and enlarging those already existing; an ablution room should be provided; the cook-house should have steel boilers and oven; the latrines should be reconstructed with Macfarlane's apparatus, supplied with water and drained, but if there be no outlet the latrines should be constructed to be flushed out daily into a cart. As extensive works are being carried out at no great distance in which drainage will be required, it is probable that the drains of this small barrack might be connected with them.

13.—Isola Gate Barracks.

These barracks are situated at the south-eastern point of Senglea, on sloping ground close to Dockyard Creek; they are for the protection of the gate, and their construction has been made conformable to this object without reference to health. The rooms are enclosed among high walls which effectually obstruct the outer ventilation, and they are otherwise so embedded in the works as to render efficient internal ventilation all but impossible. They consist of three sets of casemates, one on the right-hand side of the gate, another on the left-hand side, and the third in a salient commanding the approaches to the gate.

The barrack rooms at the gate consist of four casemates, two on either side, which have been divided by floors into two rooms each. The upper floors in two casemates are reached by an outside gallery, and in the two others by separate staircases, one of which is entered from without, and, in the other case, from within the lower barrack room. In this latter instance the foul air from the room below is carried direct by the staircase into the room above.

The casemates in the salient contain one room each; the casemates on the left side of the gate have a small court in front of them, on the side of which, opposite to the rooms, are two floors of smaller rooms, used as the guard room, canteen, and non-commissioned officers' quarters. In one corner of this Court, and in full view of the barrack rooms, a latrine has been constructed for the women.

There is also a narrow court in the front of the casemates to the right of the gate. The latrines are in one corner of this court, and from one end of it a passage leads through the salient down to the ditch, in which the cook-house, wash-house, &c. are situated.

The following table gives the statistics of the barrack accommodation:—

Date of Construction, time of the Knights.
Total Number of Rooms, 15.
Total Regulation Number of Men, 277.

Barrack Rooms.	Regulation Number of Men in each Room.	Dimensions of Rooms.			Cubic Feet per Man.	Superficial Area in Ft. per Man of Floor Space.	Windows.		
		Length.	Breadth.	Height.			No.	Height.	Width.
No.		Ft. in.	Ft. in.	Ft. in.				Ft. in.	Ft. in.
1	27	61 4	22 5	12 7	600	50	1	3 9	2 5
2	24	56 10	22 6	11 10	619	70	1	3 9	2 5
3	16	65 2	22 3	9 7	625	89	2	4 6	3 3
4	16	65 2	22 3	9 7	625	89	2	4 6	2 3
5	25	62 9	22 4	11 6	600	55	1 1	3 10 5 3	3 1 5 1
6	20	62 8	22 2	10 3 11 6	613	68	1	6 0	4 9
7	20	62 8	22 2	10 3 11 6	613	68	1	6 0	4 9
8	19	43 9	22 3	12 0	625	49	1	3 9	2 5

Barrack Rooms.	Regulation Number of Men in each Room.	Dimensions of Rooms.			Cubic Feet per Man.	Superficial Area in Ft. per Man of Floor Space.	Windows.		
		Length.	Breadth.	Height.			No.	Height.	Width.
No.		Ft. in.	Ft. in.	Ft. in.				Ft. in.	Ft. in.
9	38	78 0	20 4	10 9 11 10	603	51	1	2 6	22 0
11	24	50 6	21 0	10 3 12 6	600	44	1 1	6 0 5 0	4 8 5 1
12	24	46 4	20 10	10 3 12 6	600	39	1	7 0	4 6
13	24	39 6	27 8	15 1 7 4	604	45	2	3 10	2 1
18	1 Colour Serjeant	11 2 12 0	14 4 10 6	12 0	2,376	285	1	6 3	3 2
19	1 Colour Serjeant	24 0	17 2	12 0	2,376	408	1	6 3	3 2
21	Orderly Room Clerk	13 0 10 2	9 10 10 0	12 0	2,070	228	1	6 3	3 2
Guard Room	1	23 0	15 0	6 0 11 6	—	—	—	—	—
Prison Cells 2 -	- - -	16 0	9 6	1 0 14 1	—	—	—	—	—

Overcrowding.—The rooms are considerably overcrowded, for although the average cubic space per man somewhat exceeds 600 feet, the allowance is far from sufficient in such a barrack, and especially in such a climate. We have given the available accommodation in the following table, but the best way to use such a barrack is to have as few troops in it as possible. For the purposes of sufficient guard it must be occupied but it should not be considered as a place in which men are to be crowded.

Rooms.	Total present Number of Men in the Rooms.	Total proposed Number of Men in Rooms.	Deficiency of Accommodation in Men.
No.			
1	27	20	7
2, 3, 4	56	56	—
5	25	20	5
6, 7	40	40	—
8	19	15	4
9	38	32	6
11	24	18	6
12, 13	48	30	18
Total - -	277	231	46

Ventilation.—The means of light and ventilation are extremely deficient. The four lower rooms at the gate have each an embrasure at the end opposite the door. In two or three rooms there are small windows over the door; but one embrasure per room (accommodating from 20 to as many as 38 men) is the only source of light except the door.

In several rooms there are serjeants' bunks close to the doorway, still further obstructing the light and ventilation. In some of the rooms ventilating openings have been made through the roof, but they are of very little use. They should be enlarged and supplied with shafts on Muir's principle. Some of the rooms are quite dark and some are very damp. If these barracks must be occupied, it is absolutely necessary that additional window space should be obtained by enlarging the embrasures into windows carried up to the upper parts of the rooms.

The serjeants' bunks should be removed out of the rooms, and ventilating openings introduced wherever an available current of air can be obtained.

These openings should be partly shafts through the roofs and partly inlets through the walls. The whole construction of the barrack is so complicated, that it can be efficiently ventilated only by careful study, and by increasing the number of openings until the air is found to be pure night and day.

Ablution and Bath Accommodation.—The ablution room is an open shed, formerly a women's wash-house. Water has to be carried to it from a pump 50 yards distant. There are no baths. The whole arrangements are extremely imperfect and require reconstruction, with water laid on to the basins.

Cook-house.—The cook-house is in the ditch. It has eight boilers and an oven. It is at a considerable distance from the men's rooms. It requires steel boilers and oven, also roof ventilation.

Wash-house.—There is no women's wash-house; and the means of drying linen are stated to be insufficient.

Latrines.—The latrines are in the ditch; they are of the usual construction, and are flushed through a drain into the harbour. They require reconstruction.

Drainage.—The drainage is stated to be imperfect and imperfectly known.

Water Supply.—The water supply is derived from a rain-water tank, into which water from the town aqueduct can be turned to supply any deficiency.

Cells.—There are two cells cut out of the solid rock. They are quite unfit for occupation except for a few hours. They require more ventilation. The latrine belonging to them is over a drain, but is not supplied with water.

There are no workshops.

Sanitary Improvements required.—This barrack is so very defective that it would be merely a waste of money to try to make it suitable for 280 men. It would be far better as well as less costly to build a healthy barrack on the most convenient site available; but in the meantime the improvements suggested above should be carried out.

14.—ST. FRANCESCO DI PAOLA, COSPICUA.

This barrack consists of a large cube of casemated building, situated in an angle of St. Margarita lines, near the head of French creek. It is built on sloping ground close to a densely peopled neighbourhood. The barrack accommodation consists of four long casemates, three of which have embrasures at opposite ends, and the fourth has an embrasure at one end only. These four casemates are each on two levels on account of the slope of the ground. The floors of the lower end are sunk many feet below the level of the floors at the upper end, so that the four casemates form eight barrack-rooms, all communicating with each other. There is a low parapet wall, dividing the upper from the lower portions, which latter can be overlooked by the men above. Access is obtained to each level by a single door, and there are openings in the division walls to enable the rooms farthest from the door to be reached. On the side facing the public street a number of small rooms for non-commissioned officers have been built against the wall of the outer casemate. These rooms have a window on one side and a ventilating shaft at the opposite side. The rooms are on two levels. Those on the upper level open into each other; some of the lower rooms are used for the canteen, and the remainder for married soldiers. The ventilation of one of the lower rooms is carried into the one above it. There is a bastion below the lower level, along one side of which are several small cells used for prisoners; and other small casemates used for various purposes. At right angles to this row there are two floors of small rooms formerly used as officers' quarters, &c., but now partly converted into quarters for married soldiers, cook-house, &c. These rooms have a window at one side, with a ventilating shaft in the opposite wall.

The total area occupied by the work is 5,245 yards, and the subsoil is sandstone rock.

The following table shows the accommodation:—

Date of Construction, time of the Knights.
Total Number of Rooms, 15.
Total Regulation Number of Men, 149.

Barrack Rooms.	Regulation Number of Men in each Room.	Dimensions of Rooms.			Cubic Feet per Man.	Superficial Area in Ft. per Man of Floor Space.	Windows.		
		Length.	Breadth.	Height.			No.	Height.	Width.
No.		Ft. in.	Ft. in.	Ft. in.				Ft. in.	Ft. in.
1	22	51 4	19 0	9 0 9 0	667	44	Nil.	—	—
2	27	63 10	19 0	9 0 9 0	620	45	1	6 6	2 1
3	27	60 8	19 0	9 0 9 0	601	43	1	6 6	2 1
4	23	58 4	14 9	9 0 9 0	600	37	1	6 6	2 1
5	1 Married Non-commissioned Officer	14 10	8 8	6 0 6 2	2,178	128	1	3 7	1 11
6	1 Married Non-commissioned Officer	23 3	11 6	6 0 6 2	2,178	128	1	3 7	1 11

Barrack Rooms.	Regulation Number of Men in each Room.	Dimensions of Rooms.			Cubic Feet per Man.	Superficial Area in Ft. per Man of Floor Space.	Windows.		
		Length.	Breadth.	Height.			No.	Height.	Width.
No.		Ft. in.	Ft. in.	Ft. in				Ft. in.	Ft. in.
7	1 Married Non-commissioned Officer	17 7	12 0	6 0 6 2	1,836	198	1	3 7	1 11
8	1 Married Non-commissioned Officer	22 10	11 7	6 0 6 2	2,178	128	1	3 7	1 11
9	1 Married Non-commissioned Officer	22 5	11 8	6 0 6 2	1,836	198	1	3 7	1 11
12	5	21 2	11 9	18 9	646	50	1	3 6	3 0
13	1 Staff Serjeant -	14 3	8 9	18 9	1,890	126	1	5 6	2 3
14	17	39 4	19 0	11 0 17 0	610	44	1	5 9	2 3
15	15	36 2	19 0	11 0 17 0	638	46	1	5 9	2 3
16	7	34 6	19 0	11 0 17 0	660	71	1	5 9	2 3
17	11	31 6	17 4	11 0 17 0	649	48	1	3 6	2 2
Guard Room -	1	21 7	17 3	0 9 10 0	—	—	—	—	—
Prison Cells 3	—	11 5	10 10	0 11 9 10	—	—	—	—	—
Prison Cells 2	—	21 8	17 4	0 11 9 10	—	—	—	—	—
Prison Cells 2	—	21 9	17 4	5 11 9 0	—	—	—	—	—

Overcrowding.—So far as cubic space is concerned there is not so much overcrowding, as in other barracks; but the surface area per bed is too small, on account of the height of the casemates. The whole work constitutes in reality one barrack room, intersected by division walls, and on two levels; and the cubic space and surface area may be considered as common. It would be very advisable to reduce the number of beds by about one fourth. Were this done the accommodation would be as follows:—

Rooms.	Total Number of Men.	Proposed Number of Men.	Deficiency of Accommodation in Men.
No.			
1, 2, 3	76	58	18
4	23	19	4
14, 15	32	22	10
16	7	7	—
17	11	8	3
Total - -	149	114	35

Ventilation.—The window and door space are very limited, and the former might be very advantageously augmented by additional openings; indeed some parts of the accommodation are almost dark. There are shafts in the roof of each arch for ventilation, but they are scarcely sufficient, and from their faulty construction they have to be closed in tempestuous weather. They should be increased in size or in number, and so constructed as to be capable of being permanently open. Inlets for fresh air should also be made in the opposite ends of each casemate close to the crown of the arch. In the small front rooms where the foul air of the lower rooms is unfortunately carried into the rooms above, separate outlet shafts and ventilation should be provided for each room. If these improvements are carried out, this barrack will be as healthy as its construction admits of. It is in fact a defensible work rather than a barrack, and is not suited for permanent occupation in such a climate.

Ablution and Bath Accommodation.—There is no proper ablution room. The present accommodation, such as it is, is very bad. There are no baths.

Cook-house.—The cook-house is under the old officers' quarters. It contains six boilers of the old pattern, but no oven. It has ventilation at the back and over the door.

Women's Wash-house.—There is an open shed used for this purpose.

Latrines.—There are two latrines, one for men and one for women, in two of the cells already mentioned. The ashpit is between them, from which the refuse is removed by contract every other day. The latrines consist of deep porous stone troughs, which are flushed out into the creek. There is no ventilation except by the door, and the whole arrangements are defective and offensive. The urinal is under the same roof.

Drainage.—The bastion is drained, and the sewer is carried through the works to the creek. The surface drainage is said not to be sufficient.

Water Supply.—Water for all purposes is derived from a rain-water tank; but the amount is insufficient, and has to be supplemented by the commissariat water cart. We have been informed by Dr. Burrell that there used to be a second tank, supplied by surface drainage from a filthy ditch in which there was a pig stye; and that in 1851 he urged, without success, a water supply being laid on to the barrack from a public reservoir about 100 yards distant, on account of the deaths of 23 men by cholera in 13 days out of a single company which then occupied the place. The surviving men had to be withdrawn as a measure of safety.

Cells.—There are prison cells in the bastion in addition to those in the old officers' quarters. The separate cells are good. They have a good yard in front and a cook-house.

Sanitary Improvements required.—These barracks are in many points deficient, and are in other respects among the worst in the command. There are no officers' quarters, no school, no reading room, nor any day room for the men. All that can be done is to diminish the overcrowding; to improve the ventilation until it is sufficient by night and day; to build a proper ablution and bath room; to provide steel boilers and an oven; to reconstruct the latrines and urinals on the plan already recommended for other barracks; to abolish the ashpit and substitute an iron box; and to improve the drainage and water supply. But it would be much better to abandon the place altogether, at least as a barrack for permanent occupation.

15.—Vittoriosa Gate Barrack.

This is an old bad barrack situated in a densely peopled and unhealthy position. It consists of two floors of casemated rooms on a slope, intended to accommodate 120 men. The rooms are in steps one above the other. There is only one entrance, and all the rooms communicate by stairs and doors through the walls. In its present state this barrack is quite unfit for occupation, and has been condemned. At the time of our inspection it was occupied by married people. There is a cook-house used as a women's wash-house; it is quite dark. The rooms require more ventilation and proper conveniences to render them in any way suitable for their present purpose.

Vittoriosa Main Guard.

This is simply an archway through the works, with a door at each end and a window above the door. There is a stair in the floor apparently communicating with the ditch outside, which appears to be used as an ashpit or depository for filth. There are no cells, and no prisoners' room. This guard is indeed one of the most defective we have ever seen. It is quite unfit for its purpose, and requires reconstruction or removal to another locality. The whole neighbourhood has a ruinous aspect consequent on the explosion of a powder magazine in 1806, from which it appears never to have recovered. It requires sanitary improvement in drainage, paving, and cleansing, in the same manner as Valetta has been dealt with. We are desirous of specially calling the attention of the authorities, both civil and military, to the subject, as the neighbourhood is one of the very worst in the garrison.

16.—Couvre Porte Barrack, Vittoriosa.

This is a small casemated barrack for 62 non-commissioned officers and men (but it has had as many as 95 men in it), constructed in a ravelin outside Vittoriosa gate. The rooms are in two floors, and are in two sets at right angles to each other, following the outline of the work.

The following table gives the accommodation:—

Barrack Rooms.	Regulation Number of Men in each Room.	Dimensions of Rooms.			Cubic Feet per Man.	Superficial Area in Ft. per Man of Floor Space.	Windows.		
		Length.	Breadth.	Height.			No.	Height.	Width.
No.		Ft. in.	Ft. in.	Ft. in.				Ft. in.	Ft. in.
1	6	25 3	12 5	13 8	635	52	1	3 6	3 11
2	6	25 3	11 9	13 8	600	50	1	3 6	3 11
3	6	25 5	12 0	13 8	600	51	1	3 6	3 11
4	4	17 0	13 9	12 8	714	58	1	3 6	3 11
5	11	35 2	13 5	6 3 5 3	644	42	1 1 1	4 7 6 10 3 1	1 5 4 4 5 3
6	4	20 11	12 2	3 0 6 6	589	63	1	3 6	3 11
7	4	20 11	12 2	3 0 6 6	589	63	1	3 6	3 11
8	4	20 11	12 2	3 0 6 6	589	63	1	3 6	3 11
9	9	16 11 24 0 15 0	14 2 13 9 4 2	12 8 12 8 6 5	659	66	1	3 8	4 2
10	8	13 0 16 11 16 10 16 10	8 5 13 9 13 9 13 9	5 8 6 5 5 8 6 5 5 8 6 5 5 8 6 5	591	90	1 1	6 10 3 9	4 4 4 11
Guard Room -	Nil.	—	—	—	—	—	—	—	—
Prison Cells -	Nil.	—	—	—	—	—	—	—	—

The high walls of Vittoriosa rise close to the barrack, and tend to stagnate the air. The rooms themselves open to the outer air only at one end. At the opposite end they are built against the work, and the lower rooms are partially cut out of the rock. The construction is not a good one for health.

Overcrowding.—This barrack gives more superficial area per man than most others, but the cubic space in some of the rooms is too small. It would be better to remove one man out of each room.

Ventilation.—The rooms have a fan-light over the doors, which can be taken out, but not opened in the usual sense, as it has no hinges. All the rooms except one have a shaft carried up to the parapet from the end of the room opposite the door, but there are no inlets for fresh air. The shafts are besides too small, and their area is still further contracted by thick iron gratings over the openings in the parapet.

To improve the ventilation it will be necessary to hinge the frames of the fan-lights, so that they can be pulled partially open.

The foul-air shafts should be enlarged, and gratings or louvres with more open area placed over them above. Each room should also have a properly louvred inlet introduced close to the roof above the fan-light.

Ablution and Bath Accommodation.—This consists of a dark room. Water has to be carried from a well. There is no bath. There should be a pump to throw water from the well to a cistern, whence it should be laid on to the ablution table and to a bath.

Cook-house.—The cook-house has boilers of the usual pattern, but no oven. Water is not laid on. Steel boilers and oven should be provided.

Wash-house.—There are no means of washing or drying linen. When married quarters are built wash-houses should be provided near them.

Latrines and Urinals.—The latrine is situated within Vittoriosa Gate, and is common to both barracks. It is of the usual construction, and is flushed into a cesspit in the adjacent ditch, which is emptied occasionally by contract, a process which gives rise to great nuisance as well as danger to health. The cesspit should be abolished, and the latrines properly drained to the sea; but if this is impracticable a Macfarlane's latrine to be flushed into a cart daily for removing the soil should be adopted.

Ashpit.—There is an ashpit for collecting the refuse. It was very offensive, and quite unnecessary. In such a situation the whole refuse should be collected and removed daily in an iron box, and the ashpit abolished.

Chapel School, St. Margarita Hill, Cospicua.

This is a very good, recently erected chapel school. It is spacious, light, and cheerful, and affords a gratifying contrast to the older military buildings of the garrison.

The only point requiring notice, is that the means of ventilation which have been provided are not quite sufficient. There is a wooden ceiling through which a number of openings have been made into the space under the roof, but there are no means of egress for the hot foul air, except an opening in the gable at each end. To supply the defect it will be necessary to place two louvred turrets of sufficient size on the ridge of the roof.

There are no inlets for fresh air, and the upper portions of the windows do not open. A number of inlets, with louvred ventilators, should be made close to the ceiling on opposite sides of the apartment, and the upper parts of all the windows should be hinged and supplied with ready means of opening and shutting.

17.—POLVERISTA GATE, COSPICUA.

The barracks for the defence of this gate are situated along the top of an immense curtain connecting two bastions, and stretching across a deep ravine. They consist of a series of casemates in the thickness of the wall, entered from an open terrace 164 yards in length, and a yard and a half wide. The gate passes through the centre of the curtain, at the bottom of the ravine, many yards below the barracks.

The site is a lofty one, and commands extensive views, but the ground about the place is barren and very dusty. It becomes very hot during summer, and, as there is much wind at times, the atmosphere becomes filled with hot, dry dust; and the troops who have occupied the barracks are stated to have suffered considerably from ophthalmia.

There are 18 casemates used as barrack rooms. They are all alike in construction. Each room is 33 feet long, 18 feet 6 inches broad, 9 feet 8 inches to the spring of the arch, which is semicircular, with a rise of 9 feet making the total height of the room 18 feet 8 inches. Each casemate has a door opening in the centre of one end, and two windows over the door 4 feet 8 inches by 3 feet 1 inch. There are no windows at the end opposite the door, and the beds at the end are 30 feet from the nearest inlet for fresh air.

Overcrowding.—The regulation number of men is 14 per room, and each man has 581 cubic feet of space and 44 superficial feet. The rooms are hence overcrowded. At the very most they should not be allotted for more than 12 men per room.

Ventilation.—Except the doors and windows, the only means of ventilation provided are small shafts at the far end, which are carried up into the parapet above. They are not sufficient to keep the air pure; they should be enlarged, and a properly louvred inlet should at the same time be provided close to the crown of the arch over the door.

Ablution and Bathing Accommodation.—The barrack having only recently been completed, the ablution arrangements were of a very temporary character. A casemate in the centre of the line of barrack rooms was about to be fitted up for a lavatory. There is no water supply nearer than a well at the bottom of the ravine, and water has to be carried up to the level of the ablution room; the foul water being thrown into tubs and carried away. The whole arrangement is most inconvenient, and requires entire remodelling. Water should be laid on to a cistern for the ablution room, and the waste water drained into the same collecting tank as the latrine drainage is led to.

Water Supply.—The only source of water is the well alluded to, and another at a short distance; but a branch aqueduct passes the works sufficiently near and at such an elevation as to allow water to be properly laid on to the barrack. This great improvement should be carried out forthwith. If for any reason it be impossible to do so, the water supply for the barrack should be raised from the well by a force pump.

Cook-house.—There was no proper cook-house at the time of our inspection. A casemate had been temporarily occupied for the purpose, but it had no proper fittings, and no chimney, and the smoke was an intolerable nuisance and discomfort. All the water had to be carried. A suitable cook-house, with steel boilers and oven, and water laid on with drainage, should be provided as near as possible to the barracks. If no more convenient site is available, we would recommend the cook-house we saw to be properly fitted up and rendered suitable for its object.

There is no accommodation for washing linen.

Latrines and Urinals.—These conveniences are situated at one end of the line of barrack rooms. They are of the usual construction, and are washed out with water, which has all to be carried up by hand. They are drained through the works into a large cesspit outside the gate in the ditch. Although at a considerable distance from the barracks, there is great nuisance experienced when this cesspit is emptied. There appears to be no outlet for this drainage at present, and all that can be done is to reduce the nuisance as much as possible by ventilating the cesspit by a shaft carried up from it to a height of several feet above the top of the parapet, and by using a sewage pump for raising its contents into a proper closed cart for removal. Or a raised iron or stone sewage tank to receive the flushing of the latrines and other waste water might be placed in an angle of the curtain, at such an elevation as to admit of its being discharged into a properly constructed close cart. The tank would require ventilation by a shaft carried above the parapet. It should be large enough to hold four days' consumption of water. The tank should be emptied into the cart daily if possible. The present cesspit should then be filled up.

Married Quarters.—The married quarters belonging to this and other barracks are in a range of fortini in an adjoining curtain. Each quarter should consist of two fortini, with a door between them through the pier, and all upper floors should be removed.

The canteen is also in them. It is very imperfect, and requires re-arrangement.

Officers' Quarters.—One casemate is used as an officers' quarter, but there is no servants' room, and it is hence deficient. It would be better to have the officers' quarters at Zabbar gate, which is at no great distance, and to add the present quarter to the men's accommodation.

Sanitary Improvements required.—These are sufficiently indicated above, and should be carried out while the barrack accommodation is being completed.

18.—ZABBAR GATE BARRACK.

This is a small barrack for troops defending the gate. It consists of two sets of casemates, one on either side the gateway, with the road passing between them. There is an upper floor over the gateway containing officers' quarters. The situation is lofty and airy, but the construction of the barracks is not good, and they are stated to be occasionally unhealthy. They were built in the time of the Cotoneras, and, however well adapted they may be for defensive purposes, they are not very suitable for constant occupation by troops.

The following table gives the accommodation:—

Rooms.	Number of Men.	Dimensions of Rooms.			Cubic Feet per Man.	Superficial Feet per Man.	Windows.		
		Length.	Breadth.	Height.			Number.	Height.	Width.
Nos.		Ft. in.	Ft. in.	Ft. in.				Ft. in.	Ft. in.
1, 2, and 5, each	11	34 5	13 9	7 1 14 0	640	44	1	3 6	3 6
3 and 4, each -	22	38 10 33 2	11 1 18 5	3 9 16 0	626	51	1 1	4 3 3 6	4 7 3 6
6	12	29 7	18 10	7 11 12 6	647	44	1	3 6	2 6
Officers' Guard Room -	12	30 0	15 6	3 9 15 1	630	39	1	6 10	5 2
Guard Room -	1	31 10	11 2	3 9 16 1	—	—	—	—	—

These seven rooms have regulation accommodation for 183 men, although only occupied by 101 men. Notwithstanding the size of the rooms, their floors are rather crowded with bedsteads, on account of the height of the arches, by which the cubic space is to a great extent at a useless height above the floors. They are certainly not adapted for 183 men, and ought to contain no more than 120 at all ordinary times.

Ventilation.—The chief source of the light and ventilation is from embrasures or small windows, the frames of which can be taken out, but do not admit of being opened. There are also openings two feet square in the crowns of the arches, with a short ventilating shaft rising above the roof outside. These shafts are not properly constructed, and are fitted with wooden covers to keep out the rain. As these covers close the shafts entirely, the ventilation is completely stopped every rainy day. In their present state the rooms are dark and badly ventilated; but these defects admit of remedy by introducing more windows, or enlarging existing windows, wherever it can be done with safety. Permanent inlets for fresh air, properly louvred, should also be introduced at the top of the walls under the arches, and the shafts in the roof should have louvred turrets to keep out the rain, and at the same time to admit of their being constantly open.

Lavatory and Bath Accommodation.—This consists of a small shed, without any means either of washing or bathing. A room of proper dimensions, and suitably fitted up, should be provided.

Cook-house.—This is an underground bombproof below one of the barrack rooms. It has four boilers, but no other means of cooking. Water has to be carried from a tank, and there are no means of drainage. All refuse water has to be carried out by hand, and is emptied on the neighbouring glacis of St. Clement. The improved steel boilers and oven should be introduced.

Wash-house.—There is no women's wash-house.

Latrines.—The latrines for non-commissioned officers and men, and also for women, are in the same building, and are entered by different doors. They are not drained, but are connected with a cesspit, which is said to be emptied by the contractor once in three months, the operation lasting three days. The cesspit is only 20 yards from the men's quarters. The latrines require additional ventilation. They require reconstruction, with Macfarlane's apparatus, to be flushed out daily into a cart.

Drainage.—There is no drainage. The surface water flows into a neighbouring field. The cook-house water, as already stated, is thrown on the glacis, and other slops are thrown into the ashpit. These defects should be remedied in connexion with any drainage works carried out in the district. If no outlet can be obtained, the waste water from the ablution room and cook-house should be conducted to a distance sufficient to prevent injury, and allowed to run away on the surface; or the whole sewage might be collected and removed in the way recommended above for Polverista Barrack.

The Water Supply is derived from a rain-water tank, which appears to receive a considerable amount of surface drainage and impurities. At the time we examined the water it was very muddy, and unfit for use. A better supply is absolutely necessary. It should be brought from the aqueduct to cisterns for the ablution room, cook-house, and latrines.

Married Quarters.—These are in the adjacent fortini. As already stated, there is no wash-house for linen, and the women cook in the open air in small fire-clay stoves, which answer every purpose. These fortini should be dealt with as already described.

By far the best part of the barrack are the officers' quarters, which are high, well ventilated, and overlook the surrounding country; but as a whole this barrack is a very inferior one, although it has the advantage of an open, healthy position. We have suggested above all the sanitary improvements of which it is capable, but it will never be fit for occupation by more men than are simply required for guard duty.

19.—St. Clement's Bastion.

This is a new barrack for 56 men, situated in the Cotonera lines, and in the great Verdala intrenchment. The men's rooms are in a ravelin, consisting of a series of casemates connected together through the middle, and having only one door of entrance.

The officers' quarters are in the intrenchment.

The barrack was occupied for the first time in January 1861.

The accommodation is as follows:—

Rooms.	Number of Men per Room.	Dimensions of Rooms.			Cubic Feet per Man.	Superficial Feet per Man.	Loopholes.		
		Length.	Breadth.	Height.			Number.	Height.	Width.
Nos.		Ft.	Ft.	Ft.				Ft. in.	In.
1, 2, 3, 4	12	40	14	14	653	46	12	1 3	3
5	8	40	11	14	770	55	20	1 3	3

Overcrowding.—The superficial area per man is about a third less than is required for health. The first four rooms in the table should accommodate at all ordinary times no more than 8 men per room; and the room No. 5 would be better with 7 than with 8 men.

Ventilation.—The only means of light to these casemates is by double tiers of loopholes, the lower tiers only of which have windows capable of opening to admit air. Shafts have also been carried up through the roofs. The light and ventilation are very deficient, and require improvement. Permanent inlets should be provided at the top of the outer walls, and the loopholes should be enlarged into small windows, all of which should be capable of being opened.

These windows might be supplied with loopholed wrought iron shutters, which would be quite as effectual against shot as the soft Maltese stone, and capable of being used in the event of its being necessary to do so. This plan has, we believe, been already proposed, and it is the only one by which the rooms can be preserved in a wholesome condition.

Although the barrack was occupied at the time of our inspection some parts of it were unfinished. This was the case with the ablution room and cook-house. This cook-house should have steel boilers and oven. The surface drainage was also imperfect.

The Latrine is a cave cut out of the rock, and is of the usual construction. The trough is of porous stone, and too deep. The urinal is also of porous stone. Macfarlane's latrines and a slate urinal should be substituted, and if no drainage has been provided the arrangement already described should be adopted.

20.—FORT MANOEL.

This fort is situated on an island in the Quarantine harbour, close to the Lazaretto, and at a sufficient height above the sea level to ensure a good fall for drainage. The position is exposed to the sea breeze, and is healthy. The area within the fort, exclusive of the ditch, is 22,500 square yards. The subsoil is the ordinary sandstone rock of the neighbourhood.

The fort is a square with salients. Across the higher end of the square are two blocks of building in line containing officers' quarters, and the chapel now used as a school. At right angles to these are two detached blocks bounding other two sides of the parade ground, containing men's rooms, quarters, offices, &c. Behind the line of officers' quarters, and separated from it by a narrow lane, is a row of casemates constructed against the works, the wall of which, partly of rock, forms the end wall of the casemates to a third of their height. Over the casemates are other works rising above the outer line. These casemates are thus embedded, as it were, in the defences, and they project into the salients. They are occupied as soldiers' quarters, stores, cook-house, &c. The floors are of course below the level of the works behind; from the slope of the ground they are also partly below the level of the surface outside.

The floors of casemates Nos. 1 to 12 are of soft sandstone. The others are hard stone. The flooring in the largest casemate is in a bad state of repair.

The rooms have windows in the built part of the end wall, but at some height above the floor. The casemates in the salients are irregular in form, and have windows on three sides. They are by far the best ventilated, but the general aspect of the whole of them is dullness and deficiency of light, defects which cannot be removed.

The men's rooms in the detached blocks are much better, although admitting of improvement. They are in two floors; each pair of rooms above and below forms a barrack house, and there is an inside stair passing from the room below to the room above, occupying space, interfering with the ventilation, and allowing the foul air from the room below to pass into the room above. All these rooms should at once have the stairs removed, and access to the upper floor should be provided by a verandah with stairs at the ends.

The following table gives the details of the barrack accommodation:—

Date of Construction, time of the Knights.
Total Number of Rooms, 24.
Total Regulation Number of Men, 317.

Barrack Rooms.	Regulation Number of Men in each Room.	Dimensions of Rooms.			Cubic Feet per Man.	Superficial Area in Ft. per Man of Floor Space.	Windows.		
		Length.	Breadth.	Height.			No.	Height.	Width.
No.		Ft. in.	Ft. in.	Ft. in.				Ft. in.	Ft. in.
1	66	95 0 38 9 38 9 22 0	17 4 13 10 13 10 13 10	6 5 8 0	545⅚	40¼	1 6	4 5 5 4	4 5 4 5
2	11	32 7	15 9	6 9 9 0	656½	46½	1 1	5 4 4 5	4 10 4 5
3	11	32 7	15 9	6 9 9 0	656½	46½	1 1	5 4 4 5	4 10 4 5

Barrack Rooms.	Regulation Number of Men in each Room.	Dimensions of Rooms.			Cubic Feet per Man.	Superficial Area in Ft. per Man of Floor Space.	Windows.		
		Length.	Breadth.	Height.			No.	Height.	Width.
No.		Ft. in.	Ft. in.	Ft. in.				Ft. in.	Ft. in.
4	11	32 7	15 9	6 9 9 0	656½	46½	1 1	5 4 4 5	4 10 4 5
5	11	32 7	15 9	6 0 9 0	656½	46½	1 1	5 4 4 5	4 10 4 5
6	9	33 0	16 0	7 0 9 0	837	58⅔	1 1	5 4 4 5	4 10 4 5
7	9	33 0	16 0	7 0 9 0	837	58⅔	1 1	5 4 4 5	4 10 4 5
8	9	33 0	16 0	7 0 9 0	837	58⅔	1 1	5 4 4 5	4 10 4 5
9	9	33 0	16 0	7 0 9 0	837	58⅔	1 1	5 4 4 5	4 10 4 5
10	9	33 0	16 0	7 0 9 0	837	58⅔	1 1	5 0 4 5	4 10 4 5
11	9	33 0	16 0	7 0 9 0	837	58⅔	1 1	5 4 4 5	4 10 4 5
12	30	96 0 39 0	15 10 13 9	7 0 9 0	982⅔	68½	5 1 1	5 4 7 0 5 0	4 10 3 0 3 0
13	12	13 10 15 9 30 8	9 9 14 0 13 9	10 6 6 6 3 0	588	65½	1 1	2 6 2 0	3 6 3 6
14	11	14 0 13 9 30 8	13 10 13 9 13 9	10 6 6 6 3 0	662	72	1 1 1 1	7 0 5 0 2 6 2 0	3 0 3 0 3 6 3 6
15	10	14 0 13 9 30 8	13 10 13 9 13 9	10 6 6 6 3 0	728	79⅓	1 1 1 1	7 0 5 0 2 6 2 0	3 0 3 0 3 6 3 6
16	10	14 0 13 9 30 8	13 10 13 9 13 9	10 6 6 6 3 0	728	79⅓	1 1 1 1	7 0 5 0 2 6 2 0	3 0 3 0 3 6 3 6
17	10	14 0 13 9 30 8	13 10 13 9 13 9	10 6 6 6 3 0	728	79⅓	1 1 1 1	7 0 5 0 2 6 2 0	3 0 3 0 3 6 3 6
18	10	14 0 15 8 30 8	9 6 13 9 13 9	10 6 6 6 3 0	704¾	79⅓	1 1	1 10 2 6	2 6 3 6
19	Canteen - -	14 0 15 8 30 8	9 6 13 9 13 9	10 6 6 6 3 0	—	—	1 1	1 6 1 10	3 6 2 6
20	2	13 10 15 8 30 8	10 3 13 10 13 9	11 0 6 6 3 0	1,746	390	1 1 1 1	5 6 7 0 2 0 3 0	3 0 3 0 3 9 3 6
21	15	14 3 14 0 30 8	13 10 13 0 13 9	10 0 6 6 3 0	252⅔	53⅓	1 1 1 1	5 6 7 0 2 0 3 0	3 0 3 0 3 9 3 6
22	15	14 3 14 0 30 8	13 10 13 0 13 9	10 0 6 6 4 0	252⅔	53⅓	1 1 1 1	5 6 7 0 2 0 3 0	3 0 3 0 3 9 3 6
23	15	14 3 14 0 30 8	13 10 13 0 13 9	10 0 6 6 4 0	252⅔	53⅓	1 1 1 1	5 6 7 0 3 0 3 0	3 0 3 0 3 9 3 6
24	15	14 3 14 0 30 8	13 10 13 0 13 9	10 0 6 6 4 0	252⅔	53⅓	1 1 1 1	5 6 7 0 2 0 3 0	3 0 3 0 3 9 3 6
Guard Room -	2 Guard Rooms; 1 for 1 Officer, 1 for 18 Men -	24 0	17 0	8 11 9 6	367	22⅔	each 1 2	5 4 1 10	4 10 1 5
Prison Cells 2 each	—	8 0	7 0	9 10	550	56	6	1 10	2 5
Prison Cells 6 each	—	11 0	6 0	11 6	759	66			

Overcrowding.—It will be observed that the amount of space per man varies in some rooms to the extent of two or three times what it is in others, and that with a few exceptional cases the superficial area is much smaller than ought to be allowed in such a climate.

No. 1 casemate should contain no more than 50 men, instead of 66. Nos. 2, 3, 4, and 5 should have 10 men per room instead of 11. Nos. 13 and 14 should have 10 men each, and Nos. 21, 22, 23, and 24 should have 6 men each instead of 15. These reductions would give 258 men, instead of 317, as the strength for which there should be accommodation in the fort.

Ventilation.—There are no means of ventilation except by doors and windows; and as many windows have no glass, but only wooden shutters, which must be closed in rainy or wet weather, the rooms are not only left without ventilation, but almost without light, whenever this is done. All the barrack rooms, therefore, require ventilation by shafts carried up from the ceiling to above the roof, and terminating in louvred turrets, and by louvred inlets in the outer walls near the ceiling, wherever they can be most advantageously placed to catch external currents of air (*See* Plans X. and XI., and Fig. 19). All the windows should also have glazed sashes.

Ablution and Bath Accommodation.—None. This accommodation it was stated was in course of being supplied.

Cook-house.—There is one cook-house, under the cavalier. It is in reality a branch of the large casemate No. 1, divided off by a wall. An opening is left under the wall to assist in ventilating the cook-house. The floor is 5½ feet below the level of the ground outside. It contains 8 iron boilers, and no oven. Partly from position, and partly from not being exposed to air currents, this cook-house is intolerably hot. A large double wooden shaft has been carried from its roof above the top of the works, but it is quite insufficient to keep down the temperature. Without mechanical means of renewing the air it will never be possible to keep the place cool; but it would be much better to provide a proper cook-house than to incur such an expenditure. There are no means of draining away the refuse water at present, and there is no water laid on. All the water required for cooking has to be carried from pumps in the barrack square, down the stairs to the cook-house, and the refuse water has to be carried up again, and then to a drain. It is stated that a drain could be easily constructed. We recommend the erection of a detached cook-house on Plan XIX., in some convenient locality, and that it be fitted up with steel boilers and oven. It should be light and airy. Water should be laid on from a cistern. There should be a drained sink, a place for coals, an iron box for refuse, and a broad table for giving out the dinners.

Wash-house.—There is no place for washing the barrack linen within the fort, nor are there any married quarters, properly so called.

Latrines and Urinals.—These are of the usual construction, and are drained to an outlet in the harbour 150 yards away. They require the usual reconstruction.

Drainage.—The only surface drainage is that afforded by the slope of the ground. The drainage generally is said to be sufficient, except that of the cook-house already mentioned.

Guard Room and Cells.—At the entrance to the fort is the guard room, with cells attached to it, and a little higher up are the provost cells.

All the cells require more ventilation. The provost cells should have either an opening over the door or a shaft in the roof. The privy belonging to these cells requires ventilation.

A large disused magazine in one of the salients was being converted into a reading and day room, for which it would afford ample accommodation.

The Sanitary Improvements required for this barrack are sufficiently indicated above.

Lazzaretto Barracks.

This establishment belongs to the civil government, by whom it has been lent temporarily for the purpose of increasing the barrack accommodation at Fort Manoel; but it may be reclaimed at any moment for its original purpose. The buildings are of considerable extent, and are situated along the sea shore under the fort. They are arranged in a series of squares, containing magazines for goods, and quarters for persons undergoing quarantine. At a short distance is the Plague hospital, at present occupied as soldiers' rooms and married quarters.

The Lazzaretto proper is a complicated series of buildings, apparently constructed at different times, and without any regard to sanitary considerations. It contains many apartments of various dimensions; some of them very large, dark, and without ventilation, others smaller and with more light and air. The courts are all closed, and surrounded by the high walls of the buildings, which stagnate the air from which most of the ventilation, such as it is, is derived. Taken as a whole, although better than some other quarantine establishments in the Mediterranean, this lazzaretto is not a fit place for habitation, and it has been planned apparently more under the influence of fear than of an enlightened consideration for health.

The Plague hospital is a very singular specimen of hospital architecture. It consists of three double rows of cells about 12 feet by 9 feet, built back to back. The cells are on the ground, and the rows are separated by narrow alleys from each other. The whole hospital is surrounded by walls higher than itself, and is about the last place where a case of severe febrile disease might be expected to progress favourably. The only part of the establishment at all fit for sick is the medical officer's quarters, which face the sea, and cut off the ventilation on that side.

There were about 200 men in the quarantine establishment at the time of our inspection, most of them in casemated rooms, apparently constructed for merchandize.

A privy at the end of one of the corridors is discharged through a cleft in the rock, from which the ventilation of some of the rooms is obtained.

The whole accommodation is of a very imperfect character, and may be taken as indicating a want of barrack room, rather than as supplying a want.

As the present occupation is only temporary, we have no recommendation to make as to its improvement, except that wherever additional ventilation can be given to the rooms by louvres in the wooden shutters or windows, it should be done.

It is to be hoped that advancing intelligence, and real sanitary improvement, such as is now progressing in Malta, may lead to the abolition of this lazzaretto at no distant period, and to its vast store rooms being turned to some useful commercial purpose.

21.—Fort Tignè.

This fort is situated on a point of land on the west side of the mouth of the Quarantine harbour. The situation is completely isolated, almost surrounded by the sea, at a sufficient elevation to ensure thorough drainage; and it ought to be healthy.

The fort is a quadrangular lozenge-shaped structure, the sides of which are composed of casemates surmounted by batteries, enclosing a large court-yard or parade ground. At one of the points is a round tower, through which access is obtained to the interior, and from the tower a caponière is carried across the court diagonally to the opposite angle, dividing the ground into two equal triangular portions.

The total area within the counterscarp is 11,520 square yards. The subsoil is rock of the ordinary porous formation. The level of the court is considerably below the level of the ground outside, which forms the glacis of the fort; the round tower being the only part visible from a distance. All the buildings are constructed of soft Maltese stone, and have stone floors.

The men's rooms are in the casemates, on two sides of the fort, in the tower, and in the caponière. The other casemates are occupied as officers' quarters, stores, cook-houses, canteen, &c.

The casemates in the sides have each a separate door and two loopholes on each side of it, with a window over, together with loopholes at the further end. The rooms in the caponière have loopholes on opposite sides. The large room in the tower has loopholes at short distances all round.

The rooms are generally deficient in light, and as the windows are only provided with boarded shutters, the rooms are dark whenever high wind or rain necessitates the openings being closed. There is one large room for 20 men in the angle of the works opposite the tower, which has no windows at all: light is only obtained from small openings in the roof. The whole accommodation is only such as should be used simply for a guard or during the emergency of a siege.

The following table gives the details of the accommodation:—

Date of Construction, time of the Knights.
Total Number of Rooms, 17.
Total Regulation Number of Men, 106.

Barrack Rooms.	Regulation Number of Men in each Room.	Dimensions of Rooms.						Cubic Feet per Man.	Superficial Area in Ft. per Man of Floor Space.	Windows.				
		Length.		Breadth.		Height.				No.	Height.		Width.	
No.		Ft.	in.	Ft.	in.	Ft.	in.				Ft.	in.	Ft.	in.
1	School - -	20	5	16	2	8 4	0 10	—	—	8	2	2	1	0*
2	14	44	0	16	0	8 4	0 10	560	50	18	2	2	1	0*
3	1	20	2	15	0	8 4	0 10	3,377	302	4 4	2 1	2 3	1 1	0* 3
4	Cook-house - -	23	2	17	0	8 3	0 0	—	—	1 1	5 3	0 9	3 3	0 6
5	7	24	3	16	9	8 3	0 0	527	47¾	7 1	2 3	2 9	1 3	0* 0
6	7	24	3	16	9	8 3	0 0	527	47¾	7 1	2 3	2 9	1 3	0* 0
7	7	24	3	16	9	8 3	0 0	527	47¾	6 1	2 3	2 9	1 3	0* 0
8	Officers' Kitchen -	24	3	16	9	8 3	0 0	—	—	6 1	2 1	2 6	1 4	0* 6
10	1	22	0	13	3	8 4	0 0	3,080	291	5	2	2	1	0*
11	8	22	0	13	3	9 3	0 0	440	36⅜	5 1	2 4	2 9	1 3	0* 9
12	8	22	0	13	3	9 3	0 0	440	36⅜	5 1	2 4	2 9	1 3	0* 9
13	8	22	0	13	3	9 3	0 0	440	36⅜	5 1	2 3	2 5	1 3	0* 10
14	8	22	0	13	3	9 3	0 0	440	36⅜	3	2	2	1	0*
15	20	37 20	0 6	25 15	0 9	9 3 8 3	0 0 4 0	598	62⅖	7 1	2 5	2 0	1 3	0* 8
16	Canteen - -	21	0	16	0	8 4	3 4	—	—	9	2	2	1	0*
17	19	49	9	19	0	9	6	421	49¾	1	4	9	3	9
Guard Room -	7	19	6	9	2	10	5	266	25½	3	2	2	1	0
Prison Cells 1	- -	19	6	7	2	10	5	1,455	139	3	2	2	1	0

* Loopholes.

Overcrowding.—Both the cubic space and superficial area per man are less than they ought to be; and the numbers of men per room should be reduced in the following proportions:—

Room No. 2 should have 13 men instead of 14; rooms 5, 6, and 7 should have 6 men each instead of 7; Nos. 11 to 14 should have 5 men each instead of 8; No. 15 is scarcely fit for occupation, and should not have above 15 men instead of 20; No. 17 should have 13 men instead of 19, its present allotment. The *men's* rooms would hence accommodate 79 men, instead of 106.

The only safe way of dealing with a work such as this, which has not been constructed on any defined sanitary principle, is to consider it simply as a defensible work, rather than as affording barrack accommodation, and to keep no more than a guard in it in time of peace.

Ventilation.—The ventilation is very deficient, partly on account of the casemates being sunk below the level of the ground, partly because the subject has not been attended to in their construction. In five of the rooms there are openings in the substance of the arch, carried laterally to the outside, most of which were stuffed up at the time we saw them. The other rooms had no independent means of ventilation. So long as the shutters are left open the rooms are ventilated, but when they are closed for any reason there is no ventilation, and the air becomes very impure. Proper inlets through the walls, and shafts, carried up through the roofs, as in Plan XI., are required in this as in other cases, if this fort is to be occupied as a barrack.

Warming and Lighting.—There are no fireplaces. The rooms are lighted by oil lamps, the oil ration for which lasts about three days. Candles are then used for the rest of the week.

Ablution and Bath Accommodation.—There is none of either class of accommodation. The men generally wash themselves at the pump. There is sufficient space for every needful convenience, and a proper ablution and bath room should be constructed on Plan XVII.

Cook-house.—There is one cook-house in a casemate. It has four boilers and a stone oven. Being situated in a corner it is very hot, and requires all the ventilation which can be obtained for it. The new steel boilers and oven, Plan XVIII., should be provided. Water is carried from the pump, and the refuse water is removed and thrown into the sea. A drain should be provided.

Wash-houses.—None. The washing is done in an old counterscarp gallery, and the linen is dried on lines across the ditch. It is hardly necessary to make any further provision of this nature unless the fort were to be converted into married quarters.

Latrines.—These are situated in an old musketry gallery. They are of the usual Maltese construction, and are cleansed by throwing down water every morning. The place is neither ventilated nor lighted. The latrines require entire reconstruction.

Drainage.—There is one drain from the latrines to the sea, with which other cross drains from the officers' water-closets, urinals, &c. are connected. The outlet is into a shallow bay close to the landing-place of the fort, and the effluvia arising from the sewage during the warm weather are said to be "horrible," and very injurious to the men. The latrine drainage should be carried into deep water at a distance from the shore by means of an iron pipe, and proper drains for surface and refuse water should be connected with it.

The drainage, such as it is, is confined to one angle of the fort, and there is no provision for carrying off the rain-fall from the parade ground, which lies on the surface until it sinks into the subsoil or evaporates. All refuse water has to be carried out by hand to the sea.

Officers' Quarters.—There are two quarters for officers in the fort, one of which is nearly dark.

Married Soldiers' Quarters.—There are none. Three of the soldiers' rooms and the officers' kitchen were inhabited by married men, and the remainder were in lodgings outside.

The Sanitary Improvements required are indicated above, viz., diminution of over-crowding, ventilation, better means of personal cleanliness, reconstruction of latrines, and of drainage, and more water. But it would be better to occupy the fort only as a place of guard or as married quarters.

22.—PEMBROKE BARRACK, ST. GEORGE'S BAY.

This is a new barrack intended for the accommodation of one commanding officer, 30 officers with 25 servants, 32 serjeants, and 980 rank and file engaged in rifle practice. It covers the crest of a rocky ridge on the west side of St. George's Bay, about three miles west of Valetta. The ground slopes rapidly towards the bay on the east, and also towards the sea on the north and north-west. The site is very favourable for receiving all wholesome breezes, and ought to be healthy. It has hitherto proved so, for up to the time we visited the barrack, it had furnished a very small per-centage, indeed, of sick to hospital; affording in this respect a striking contrast to the admissions from the barracks within the garrison.

Part of the ground was previously occupied by a camp, and many of the tents were pitched in a faulty position against the steep slopes below the ridge. It was found that these tents, although accommodating only six men each, were by no means so healthy as the new barracks.

The buildings are all on one floor. They consist of a series of arches of white sandstone, erected in blocks, in two long parallel lines, with a spacious parade ground between them. The officers' quarters are at a lower level, nearer the sea, and are constructed in a similar manner.

An arched stone verandah is carried along the east side of each line to afford shelter from the sun's rays. The rooms are all alike. They have two windows with a door between them at each end; and they are ventilated by shafts through the roof, and by inlets for fresh air.

Each room has a porch on the west side, covering the door, and entered from the side, and in the outer part of the porch is a small room containing a night urinal. All the floors are of stone, and raised above the ground, with a free circulation of air beneath.

Between every two pair of rooms are placed two serjeants' rooms, each having a door into the corresponding barrack room, but the door is never opened. These rooms are also ventilated through the roof. They have each a fireplace with the ordinary pattern barrack grate. There are no fireplaces in the men's rooms.

The accommodation is as follows:—The commanding officer has a sitting-room 19′ × 14′, and a bed-room 12′ × 13′; a small kitchen and servants' bed-room. There are three blocks of officers' quarters, each containing accommodation for 10 officers (one room 14′ × 12′ being allotted to each officer), and four servants' rooms intended for two servants per room.

The men's accommodation is placed in six blocks, of which the details are as follow:—

Blocks.	Number of Rooms.	Number of Men per Room.	Dimensions of Rooms.				Cubic feet per Man.	Superficial feet per Man.
			Length.		Breadth.	Height.		
			Ft.	in.	Ft.	Ft.		
A - -	6	1 Serjeant.	14	9	10	14	2,065	—
	14	14	30	0	21	14	630	45
B. - -	6	1 Serjeant.	14	9	21	14	4,337	—
	14	14	30	0	21	14	630	45
C. - -	4	1 Serjeant.	14	9	10	14	2,065	—
	7	14	30	0	21	14	630	45
D. - -	4	1 Serjeant.	14	9	10	14	2,065	—
	7	14	30	0	21	14	630	45
E. - -	6	1 Serjeant.	14	9	21	14	4,337	—
	14	14	30	0	21	14	630	45
F. - -	6	1 Serjeant.	14	9	10	14	2,065	—
	14	14	30	0	21	14	630	45

It would have been better to have allowed a larger cubic space per man in these new barracks, or at all events to have increased the superficial area by making the rooms *wider* and lower in the roof, but the construction is so simple and the local position so fully exposed to every breath of wind, that the defect will probably be of little consequence. In any future barracks of the same construction, and in a similar position, it would be safer to allow about 700 cubic feet and 65 superficial feet per bed; and the chief structural defect of this barrack, arranging the beds with their heads along the dead walls instead of between the windows, should be avoided.

Ventilation.—It is probable that the present shafts and inlets will be sufficient in practice to keep the air pure at night; but if not the inlets should be enlarged until this condition is secured.

Ablution and Bath Accommodation.—There is an ablution room with stone benches and a bath, but water has to be carried from a distance. The room and fittings are of the usual porous stone, and are always wet or damp. Slate slabs with basins let in should be substituted.

Latrines.—The latrines are also of porous stone, and should be reconstructed with Macfarlane's troughs. They are drained into the bay; but the sewage should be carried by an iron pipe further into the water.

There is a large cook-house with combined boilers and ovens, but they did not act properly on account of a defect in the proportionate sizes of the flues. Steel boilers and ovens should be substituted.

There is a guard room which is ventilated, but not sufficiently so. The cell and lock-up attached to it are well ventilated.

The officers' quarters referred to above are too small, as they consist only of one room without thorough ventilation. Another room could easily be added by constructing an additional floor above. This should certainly be done.

Pembroke barracks could hardly be said to be complete when we saw them. They were deficient in serjeants' mess, reading room, canteen, barrack stores, shops, married quarters, and prison cells.

The Sanitary Arrangements admit of improvement in the following points of detail:—

The porous stone urinals in the porches will have to be replaced by slate or earthenware urinals supplied with water for cleansing. The night urinal recently constructed by Jennings' should be tried here. The stone fittings of the ablution room should be replaced by slate slabs with sunk earthenware basins with water laid on from an iron cistern, into which it should be pumped from the tank. Additional fresh water bath accommodation is also required for cleanliness. There are abundant opportunities for sea bathing. The soft stone troughs of the latrines should be replaced by Macfarlane's iron or Jennings' stone-ware latrines and urinals, and water should be constantly supplied to them. As the supply of fresh water is limited, salt water should be pumped up for this purpose. Additional rain water tanks should be constructed to receive all the roof water which can be collected. The guard room requires more ventilation. The defects in the flues of the cook-house were pointed out at the time, and we believe they have been remedied.

The barrack accommodation has recently been extended by the erection of a number of large old wooden huts, brought from Gozo. They have been unfortunately placed across the line of drainage, on the steep sloping ground, which has been terraced to afford space for them. It is probable that these huts will not prove so healthy as the stone barracks, although considerable pains have been taken to isolate them from the surrounding ground.

Pembroke barrack affords a great contrast to all the other barracks in the island. Most of the recent sanitary improvements have been introduced into the plans, and the site is a very good one. By sending the troops to it in rotation, it will become a species of sea-side sanitarium, the use of which will no doubt tell advantageously on the general health of the garrison.

23.—General Hospital, Valetta.

This hospital is one of the most complicated buildings we have seen, and one of the most ill-arranged and unsuitable places for the sick of a garrison in existence.

It is situated on the south-east side of Valetta, close to the Great harbour, from which it is separated by a narrow public road and wall. The site is the lowest on that side of the town, and all the ground falls towards it.

There is an apparent advantage of position derived from the proximity of part of the sick wards to the sea; but in a climate like that of Malta, where sanitary condition depends so much on the nature of the winds, this advantage is neutralized and converted into a disadvantage by the circumstance that all healthy winds are cut off from the building, partly by its bad construction, partly by its being enclosed on three sides by a densely packed neighbourhood of lofty houses, and also because the lofty works of Fort St. Elmo intervene between the site of the hospital and the north and north-westerly winds, which are the really healthy winds. The only wind that blows directly on the sick wards is the sirocco, a well-known cause of indisposition at Malta, and the effect of which is immediately perceived on the sick. The site is hence exposed only to unhealthy winds; and at all other times there is more or less stagnation of air about it, unless there is stormy weather.

Nothing in the construction tends to redeem this defect of position, but on the contrary; for the construction is bad in two essential matters: first, it consists of two courts, one of them 34 feet below the level of the other; secondly, both courts are closed at the angles, a form of construction which renders external ventilation very difficult at any time; and the lower court, that from which the ventilation along one side of a number of the sick wards is derived, is a sunk area or well about 50 feet deep, measured from the roofs of the surrounding buildings.

There is no free circulation of air through this court except such as comes over the tops of the buildings. It is the only place where convalescents can take exercise. It was being improved in appearance by having a few trees and shrubs planted in it while we were there; a praiseworthy attempt to render the place more cheerful, but very likely, if the trees should grow up, to impede still further the ventilation and render the air more damp.

The following is the general arrangement of the hospital buildings:—

The principal entrance is at the bottom of the steep slope of the Strada Mercanti. It is through an arch, leading into a square paved court, enclosed by buildings two floors in height, containing officers' quarters, offices, pharmacy, apothecaries' stores, guard room, &c. The upper floor on one side is occupied by sick wards. At the north-eastern corner of this square there is a large arched doorway with a spacious flight of some 20 stone steps, enclosed in the buildings, leading down to the main hospital. These steps end in an arched corridor passing round the lower court at about half the height of the surrounding buildings. The lower court, which is closed and of a square form, is seen by looking over the corridor. One side of this court is cut out of the solid rock, the face of which is covered with patches of green vegetation, marking the presence of damp, and also of malaria in a warm climate. The other sides are principally formed by the hospital.

On the side next the upper square the corridor gives entrance to a number of dark, damp rooms; some of little or no use except to harbour foul air or dirt. One of these, at the end furthest from the entrance, was being fitted up as a bath and ablution room;

perhaps the best available place for such accommodation, but nevertheless not a place where sick men or convalescents ought either to wash or bathe. The baths used formerly to be in the upper square, quite away from the sick. Opposite the door of this bath room are the hospital privies, which were most offensive, and diffused their odour right and left along the open corridor.

The opposite side of the square is bounded by a long lofty building two floors in height. The lower floor, opening from the ground level of the lower court, is below the level of the ground outside, and contains stores of various kinds, the kitchen, disused stables, the dead-house, ablution room, &c. The upper floor is entered from the corridor, and contains one long lofty ward. The other two sides of the square are occupied mainly by sick, but partly also by stores and non-commissioned officers' quarters. This is, however, not the whole of the accommodation for sick. The long ward fronting the sea occupies only half the length of the hospital on that side. The building is prolonged to the south-east in the same front, and contains another long ward, facing the sea on one side, and almost blocked up along the opposite face by a line of stores built up against it, and by the narrow populous streets that environ it.

A very important disadvantage attending the length and position of the buildings is, that one of the main town sewers, draining a considerable district, passes directly under the middle of the hospital, while other two of the town sewers pass one at either end. These sewers all open above water mark, and give rise to most offensive odours during certain states of the weather. The lower floor of this part of the building is charged with foul air throughout, and at some parts it is scarcely safe to remain in the places for any length of time. The buildings were formerly the hospitium of the Knights, they are very old, and are supposed to have been amongst the earliest erected outside St. Elmo.

The following table gives the ward accommodation :—

Date of Construction, A.D. 1575.
Number of Wards, 20.
Regulation Number of Beds, 382.

Wards.	Regulation Number of Sick per Ward.	Dimensions.				Cubic Feet per Bed.	Superficial Feet per Bed.	Windows.		
		Length.	Breadth.	Height.	Cubic Contents.			Number.	Average Height.	Average Width.
No.		Ft. in.	Ft. in.	Ft. in.	Ft.				Ft. in.	Ft. in.
13*	8	21 0	17 7	16 0	5,904	738	46	2	6 0	2 7
14	7	20 0	17 6	16 0	5,600	800	50	1	6 0	2 7
17	42	96 0	30 0	23 4	67,200	1,600	68	13 { 6	7 5	3 8
								7	1 5	3 0
18	4	30 6	17 0	15 4	7,950	1,987	129	3	3 3	3 7
19	3	23 4	17 0	15 4	7,536	2,512	132	2	3 3	3 7
22	9	50 0	18 6	13 8	12,641	1,404	102	4	6 0	3 5
39	26	98 4	29 7	30 6	88,724	3,412	111	8	5 7	3 0
40	7	26 0	17 6	17 4	7,886	1,126	65	4	5 10	2 11
41	7	37 0	17 6	17 4	11,214	1,602	92	4	5 11	2 11
42	5	29 0	17 6	17 4	8,788	1,757	101	3	5 2	2 11
50	34	90 8	32 11	25 8	53,309	1,567	61	7 { 5	6 9	3 4
								2	3 6	3 3
52	6	34 6	19 2	16 8	11,016	1,836	110	3	6 4	3 7
56	13	49 7	31 0	13 4	20,493	1,576	118	6 { 5	5 3	4 4
								1	2 8	1 8
57	11	21 0	21 4	19 8	8,810	800	40	2	7 2	3 2
58	13	59 0	18 6	19 5	21,183	1,629	83	6 { 5	6 8	3 10
								1	3 0	1 8
A. 58	5	23 0	19 9	19 6	8,853	1,770	90	2	6 8	3 11
60	14	42 8	34 10	30 6	45,323	3,237	106	3	5 6	3 1
A. 60	22	73 0	34 10	30 6	77,531	3,524	115	5	5 6	3 1
B. 60	34	110 0	34 10	30 6	116,845	3,436	112	5	5 6	3 1
C. 60	110	275 0	34 10	30 6	292,159	2,655	87	19	5 6	3 1

* A small closet containing two beds, opening out of No. 13, is not included; 13 and 14 are prisoners' wards.

The data in this table are sufficient to show the extraordinary irregularity of the building. The wards are of all sizes and heights, and afford every variety of cubic space and superficial area to the sick. In most of the wards both of these requisites are very much greater than would be necessary in a properly constructed hospital.

But on the other hand most of the cubic space is useless for any sanitary purpose, as it is quite above the beds, and from 15 to 30 feet above the point where it would be useful to the patients.

The great breadth of the lower wards, and the consequent distance between opposite windows, are also most injurious to ventilation.

Another remarkable point in the construction is the entire disproportion between the window space and the cubic contents of the wards. About 50 square feet of window space for every 3,000 cubic feet of contents are necessary to admit the required amount of light and air to sick wards in such a climate as Malta; while the window space of the more important wards is only from one-fifteenth to one-twentieth part of this proportionate area, and as a consequence the wards are dark and dismal, besides being close, and the air always more or less stagnant. The windows, small as they are, are all close to the roof, so that there is nothing for the sick to look at, not even the sky, besides the dead walls and their sick comrades opposite. Medical officers complain of the bad moral effect produced on the sick by the want of light and view, and state that their patients come gradually to concentrate their whole thoughts on their maladies.

In so far as regards the sanitary state of this hospital arising out of its site and construction, there cannot be a doubt that it is very bad. Sick men recover very slowly in it. Zymotic diseases, such as fevers, become more severe and fatal while the sick are in it, and pass from the simple continued into the typhoid form. All this has been long known to observing medical officers; and lately it has been found necessary to open a sanitarium, as it is called, at Citta Vecchia, for the reception of fever cases from this very hospital, in order to save their lives. Such cases recover rapidly at Citta Vecchia, while they linger or die in the General hospital. This is a sure mark of the real state of the place, and of its unfitness for sick. But more than this, during the last epidemic of cholera at Malta, most of the cases among the troops happened in the General hospital, just where they might have been expected to happen.

Ventilation and Warming.—There are no special means of ventilation, except the windows and a number of small perforated plates about 9 inches square along the walls of the larger wards. These means are quite insufficient for preserving the air pure and in motion. Nettleton's stoves are used for warming, but in their present form they are open to the objection of not admitting warm *fresh air* into the wards.

Water Supply.—Rain water for the use of the hospital is collected in tanks. Water from the aqueduct could also be had if required. The water for hospital use is stated to be good, and sufficient in amount.

Drainage.—The drainage of the hospital is far from being in a good state, as was evidenced by the very offensive odours prevailing in certain parts of the basements, and also near the latrines. The outlet is into the sea 14 feet above water mark, and much nuisance is experienced from it in the hospital itself. There is no surface drainage of the lower court. The rain-fall percolates through the spongy sandstone, and escapes at a lower level.

Latrines.—The principal latrines are those already described; they are of the usual Maltese construction, and very offensive. There are one or two others elsewhere. But, connected with the wards, there are no water-closets for the sick, many of whom have to walk a considerable distance to reach the accommodation, such as it is. The latrine drainage is stated to be constantly out of repair, and the latrines are said to be connected with cesspits.

Ablution and Bath Accommodation.—As already stated, a bath and ablution room was being constructed at the time of our inspection. The arrangements are far from being satisfactory, but are on the whole as good as any others that could be made in such a building.

Washing.—There is no wash-house. All the hospital linen is washed by contract.

Stores.—As this hospital is partly administered on the regimental system, each regiment has its own stores.

Cook-house.—Until lately each regiment had also its own kitchen. A general cookhouse for the whole hospital has since been provided.

Serjeants' and Orderlies' Accommodation.—Each serjeant has a room for himself and family, often quite away from the sphere of his duties. The orderlies sleep in the wards with the sick. All the arrangements are bad, and cannot be altered in the present building. Indeed anything like proper hospital administration is impracticable in such a building, unless the whole internal construction were altered.

Exercising Ground.—There is none except the corridors and the damp confined area of the lower court of the hospital overlooked by the corridors.

Considered merely as a building this hospital might no doubt be made less injurious to sick than it is at present. All useless parts might be cleared away: portions of the buildings might be removed to simplify the construction, and to admit fresh air. The large wards might be improved, by greatly increasing the window space, and by suitable ventilation. Divisions might be carried up in them so as to cut off suitable wardmasters' and orderlies' rooms and sculleries. Proper water-closets and baths with wash-hand basins might be provided contiguous to the wards.

These improvements would, if thoroughly carried out, reduce materially the amount of accommodation for sick, unless the whole front of the building were raised by an additional story; but this addition would infallibly lead to greater stagnation of air in the courts. The expense besides would be very large; and after the alterations were all carried out the site would be as confined and as unhealthy as it is at present.

While we were at Malta the Commanding Royal Engineer proposed to increase the external ventilation by removing certain buildings at a trifling cost, a proposal in which we entirely concurred.

We would, in addition, recommend the enlarging of the existing windows, or rather opening fresh ones under them on a level with the beds, to improve the light and ventilation of the large wards. All the wards should be provided with a sufficient number of Muir's ventilators along the ridge, and inlets for fresh air at the eaves. Macfarlane's or Jennings' latrines should be introduced instead of the present privies, and drained by earthenware pipes. The outlet into the sea should be by an iron pipe carried into deep water.

These alterations, which would involve only a small outlay, would somewhat diminish the unhealthiness of the hospital, but they cannot be considered as in any sense rendering it fit for a garrison hospital, and sick would still have to be sent to Citta Vecchia or St. Julien's bay for recovery. We have already stated our opinion that a new hospital for 300 beds should be erected on St. Michael's bastion, and that the present building, when improved in the manner we have recommended and otherwise altered, would be suitable for extending the barrack accommodation so much wanted in this locality.

24.—Vittoriosa Hospital.

This hospital is situated at the south-eastern extremity of Vittoriosa, immediately within the works, and close to a cavalier. It is a large building, of very singular construction, originally built in the time of the Knights, not for human habitation, but for a district armoury. The site is the highest in the neighbourhood, and the flat roof of the building overlooks all the neighbouring houses, by which it is closely surrounded without any enclosure except at the front. We have been informed by an eye-witness that in consequence of this absence of enclosure he has often seen the patients smuggle spirits and fruit into the hospital by means of a cord let down from a window to the street. The lower floor is completely embedded among narrow streets of houses, which cut off the ventilation and darken all the rooms. The ground occupied by the building is on a slope, and the ceilings of the ground-floor rooms are nearly on a level with the higher end of the site, so that in order to reach the ground floor a flight of steps has to be descended to a small close court, out of which the ground floor is entered. Opening into the court are six small casemates, three on each side, used as cook-houses, orderlies' room, ablution room, privy, &c. At the end of the court is a large door giving access to a ward 74 feet long, by 23 feet 10 inches wide. This room has only one window, at the end opposite the door, opening into a narrow street, and having a high wall opposite to it. Out of this central ward there open eight small wards, four on each side. These rooms have each one small window close to the ceiling. The arrangement of this floor is exactly that of an ordinary cellular prison, except that it would be considered a very bad example of the arrangement.

Over this central corridor with its cells are the upper wards of the hospital, which are reached by an outside stair carried up one side of the court already mentioned. The wards are three in number, corresponding with the central ward and the two ranges of cells below. Two of the wards, being on the outer side of the block, have each five windows to the outer air along one side, and one window at the end. The ward between them, like the large one on the ground floor, has a window only at the end opposite the door, and it communicates with each of the side wards by two doorways carried through the division walls. On the same level with these upper wards, are a series of small rooms built over those in the sunk court below, devoted to serjeants' quarters and surgeries. As the hospital is intended for the sick of two corps, there are the customary duplicate sets of offices and rooms.

Besides the hospital accommodation in this block of building, there are other two wards in the adjacent cavalier, literally embedded in the mass of the work. One of these wards is 81 feet 8 inches long and 23 feet broad, and it is cut off from the external air by a wall 36 feet in thickness. The only light which this cavern, for it is nothing else, receives is by the door, and by two slits in the wall 3 feet high and 10 inches broad bevelled inwards through the entire thickness of the wall to a height of 7½ feet by 3 feet broad. There are also two small air-shafts in the roof.

The other ward is 39 feet by 18 feet, and is interposed between part of the long ward and the outer air. It is in fact excavated out of part of the 36 feet wall. It has only one slit opening to the outer air. Between these two parts of the hospital there is an enclosed court with a covered ambulatory on one side of it for convalescents; but as there is no view from it, and the place is otherwise dull, and the dead-house is on one side of it, convalescents prefer ascending to the top of the hospital, where they can obtain better air and a view.

There are two disadvantages attending this however: first, there is no parapet to the roof, and a weakly man if he stumbled close to the edge would fall over and be certainly killed; and, secondly, the men smoke and spit on the roof, and the rain-fall washes the whole of the filth down into the water tanks from which the hospital is supplied with water.

There are altogether 13 wards with 108 beds in the hospital proper, and two wards with 38 beds in the cavalier. The wards are, however, very unequally occupied, the number of wards in use, good and bad, depending on the strength of the corps, and on the number of sick. The whole place would be occupied if necessary, especially during epidemics, when the very best class of accommodation is required, and when the worst would be brought into use. The following table gives the statistics of the wards occupied at the time the return was made:—

Rooms.	Regulation Number of Beds per Ward.	Dimensions of Wards.			Cubic Feet per Bed.*	Superficial Area per Bed.	Windows.		
		Length.	Breadth.	Height.			Number.	Height.	Width.
Nos.		Ft. in.	Ft. in.	Ft. in.				Ft. in.	Ft. in.
4 and 6 each	23	90 5	21 3	9 3 14 0	1,169	82	2 4	10 0 8 10	5 0 3 9
5	20	71 0	22 11	8 9 16 6	1,138	78	1 1	10 0 6 0	5 0 4 6
9*a*	7	21 0	13 9	8 0 13 6	577	32	1	8 10	3 5
10	22	72 0	22 10	11 6 8 10	1,046	72	2	4 10	3 8
10*a*	7	21 0	13 9	8 0 13 6	570	32	1 1	5 7 5 7	9 6 5 2
In the Cavalier. 14	26	63 0 19 0	26 6 19 2	10 3 5 0 7 3 10 9	993	66	2	3 0	0 10
In the Cavalier. 15	12	29 4	14 11	9 1 10 5	510	30½	1 1	5 0 3 3	4 6 0 10

* Calculated at an average height of 14 feet.

Of the whole 15 wards there are only three, Nos. 4, 5, and 6, on the upper floor of the main building, in which sick ought to be placed at all. The remaining wards are absolutely unfit for human habitation in such a climate, and should at once be struck off the construction.

The place will, therefore, hold 66 sick at the utmost; and not another bed should be allowed in it. Better put sick men in wooden huts or in tents on the cavalier than expose them to such risks as they incur in these bad wards.

Besides the bad nature of the accommodation, the building is deficient in many essential hospital requisites which would have to be supplied if it is to be used at all. These we next proceed to describe.

Ventilation and Warming.—There are no special means of ventilation for the three habitable wards, and the windows are much too small. To remedy these defects, shafts should be carried up through the roof of each ward, and inlets should be provided as high up as possible in the outer side walls. The middle ward being between the others, a large inlet should be made at each end close to the top of the arch. The heads of all the windows should also be carried up nearer the roof, and the sills of the windows lowered. There are fireplaces, but iron stoves with pipes are used instead of open grates, which is by no means so good an arrangement.

Drainage.—Like the generality of Maltese drains, those connected with this hospital are merely deep cuts in the soft porous sandstone rock, covered over. A main drain of this construction passes along three sides of the hospital immediately outside the walls. The surface-water drains, and those from the latrines, are connected with this main, which has its outlet into the head of Calcara creek, about 200 yards distant. There is a very great fall for the drainage, and if the sewers were properly constructed they ought to act efficiently. Such, however, is not the case, for at times there is great nuisance from the hospital drains, especially during westerly winds, which carry the effluvia into the hospital wards. The evil might be prevented to a considerable extent by trapping all the gulley grates in and about the hospital, and by carrying a ventilating shaft from the sewer 10 or 12 feet above the roof of the hospital; but the only efficient remedy would be to reconstruct the sewers, with due regard to material and dimensions.

Latrines.—There are no water-closets attached to the sick wards. The only conveniences for the sick are latrines situated in the lower court, to which the sick have to descend two flights of steps, mostly in the open air and exposed to the weather. The latrines are situated in a dark damp casemate not suitable for weakly men to resort to. They are of the usual construction, and supplied with water from a tank and pump in the lower court. They are flushed out into the sewer.

It is indispensably necessary, if this hospital is to be occupied, that water-closets adjoining the upper wards should be provided. The only urinal is in the same casemate with the latrines.

Water Supply.—Water is derived from two sources,—the public aqueduct, and rain-water collected in tanks. The supply is stated to be abundant and good, provided care be taken to cleanse the tanks every season, and to keep the roof clean.

Ablution and Bath Accommodation.—The only accommodation of the kind is in a dark damp casemate, next door to the latrines in the lower court yard. It is open to the same objection as to position which applies to the latrines. The room has a damp stone floor, and stone washing troughs along the wall. The only baths are slipper baths, which, when filled with cold water, are used in this room; but if a warm bath is required, the tin slipper bath has to be carried up to the wards, and hot water is carried in pails from the kitchen below. The arrangements are most unsatisfactory, and should be changed. Provision should be made on the upper floor for a proper ablution room, with fixed basins and fixed baths, with hot and cold water laid on.

Cook-houses.—The hospital kitchen opens out of the lower court. It is in a casemate not well adapted for the purpose. It contains an oven, kitchen range with boiler, and four coppers. The means of cooking are sufficient, but complaint is made as to the defective nature of the cooking on account of constant change in the regimental cooks. This defect will be remedied under the new organization of the Army Hospital Corps.

Hospital Attendants.—The accommodation for hospital attendants is very deficient; but it might be improved if all the wards were closed except the three upper ones. If the surgeries were removed from the upper floor space might be found for water-closets, ablution and bath room, and for the necessary attendants.

Accommodation for the Sick of Soldiers' Families.—There is none such, although it is very much wanted. The medical officers state that the married quarters in the fortini are so inferior that it is hardly possible to attend sick in them with any prospect of doing justice to the patients. A similar remark applies to confinements. The medical officers state that it would be a great charity if some form of female hospital were provided. The best way of doing this for Malta would be to provide a room with suitable conveniences in connexion with each block of married soldiers' quarters, into which sick women and children could be moved for treatment.

The commanding officer at Vittoriosa had placed funds in the hands of the medical officer, to enable him to obtain the assistance of a nurse for the women.

We have already recommended that a new hospital be built for the barracks on the Cotonera side, in place of the buildings now in use, which are unfit for sick. Were this done, Vittoriosa hospital would afford a certain amount of useful barrack accommodation if it were rendered fit for the purpose.

25.—Hired Hospital, Vittoriosa.

This hospital is situated at the bottom of a narrow lane called Strada San Georgio, at a short distance from Vittoriosa Hospital. It consists of two adjoining private houses of the usual Maltese construction, occupying sloping ground, and close to Dockyard creek.

One of the houses is three floors in height; the other has two floors. The ground floor of No. 2 house is occupied by private families. On the lower floor of No. 1 house is the surgery, serjeant's room, cook-house, ablution room, and coal stores. Under this is the dead-house and three unoccupied cellars. There is a small, damp, dull court in the middle, out of which a number of close dark rooms open, used for various purposes.

The sick wards are all on the upper floors, which are the only favourable points about the buildings. In every other respect they are unsuited for hospital purposes, and cannot be made suitable. They can only be considered as affording temporary refuge for sick men until suitable accommodation can be provided for them.

The following table gives the accommodation:—

Wards.	Number of Beds per Ward.	Dimensions of Wards.			Cubic Feet per Bed.	Superficial Feet per Bed.	Windows.		
		Length.	Breadth.	Height.			Number.	Height.	Width.
No. 1 House.		Ft. in.	Ft. in.	Ft. in.				Ft. in.	Ft. in.
1	4	16 5	16 3	16 9	896	64	1	9 0	4 0
2	9	30 6	17 7	22 0	793	56	1	10 4	4 2
3	5	18 6	16 3	17 6	806	57	None.	—	—
4	5	18 6	15 0	16 8	756	54	1	6 8	3 5
5	5	18 7	15 2	16 9	756	54	1	6 8	3 5
No. 2 House.									
6	20	63 0	23 1	23 9	1,014	72	3	6 8 6 8 9 0	3 5 3 5 4 0
7	4	10 8	13 4	13 6	455	32	2	5 9 4 9	5 3 3 7
8	4	24 4	14 8	22 0	1,176	84	None.	—	—

The table is sufficient to show the very defective construction of the rooms, and the extent of overcrowding which prevails in them. Considered as temporary accommodation, the rooms have space for about 40 sick, instead of 56, the present regulation number.

Ventilation.—There are no special means of ventilation, except a small opening here and there. Each ward should have a properly constructed shaft carried up through the roof, and openings should be made in the outer walls close to the ceiling, so as to ensure as efficient a circulation of air as possible.

Warming.—There are no means of warming, and only one ward has a fireplace. Perhaps the easiest way of supplying the deficiency temporarily would be by stoves constructed to admit fresh warmed air.

Latrines.—There are no water-closets to the wards, but there is a set of stone latrines of the usual Maltese construction placed on the second floor, and connected by a gallery with both houses. They are supplied with water by a force-pump, and drained into the sewers. These latrines are in the narrow inner court, and have no means of ventilation. Any foul air from them would make its way into the general atmosphere of the wards. The urinals are not beside the latrines, but are on the ground floors of each house.

Drainage.—There is a good fall for the drainage into the adjacent creek. The sewers are of the usual construction, and all the hospital drains are said to be trapped.

Water Supply.—Water is derived from rain-fall collected in tanks in the usual way.

Ablution and Bath Accommodation.—The ablution room for the sick is a damp basement, with basins on a stone bench. It is by no means a place to be frequented either by sick or convalescents. There is no proper bathing accommodation, only two Maltese stone baths in a cellar, which have to be reached by going outside. Slipper baths are used in the wards for patients too ill to go outside. There is a shower bath.

Cook-house.—The cook-house is under the sick wards. It is fitted up with three boilers, a range, and two baking ovens.

Considering these houses as merely affording temporary accommodation for sick, we cannot recommend any expenditure, except for ventilation, which is always of immediate necessity. The place should be evacuated as speedily as circumstances will admit.

26.—Spinola Hospital.

This hospital, which has recently been formed in the Spinola Palace, is situated at the head of St. Julien's bay, and at a short distance to the east of St. George's camp, for the sick of which it is intended to afford accommodation.

The palace is a moderately sized cubical block of building within a large garden, and occupies a healthy position. It wants, of course, many of the qualifications required for a proper hospital, but the sick have nevertheless the benefit of fresh air, which is an advantage denied to the great majority of those treated in the garrison hospitals.

There are wards on three floors, namely, on the ground floor, on the half landing, and on the upper floor. The kitchen, surgery, and stores are on the ground floor, and the water-closet, ablution, and bath accommodation are at the top of the stairs under the roof. The purveyor's store is in the basement, and the bedding store in the yard.

The following table gives the accommodation:—

Wards.	Number of Beds.	Dimensions of Wards.					Cubic Feet per Bed.
		Length.		Breadth.		Height.	
No.		Ft.	in.	Ft.	in.	Ft.	
1	9	27	0	20	4	14	854
2	3	16	9	14	9	14	1,153
3	4	16	7	14	10	14	860
4	4	30	9	11	0	14	1,183
5	6	30	9	15	7	14	1,114
6	9	30	4	20	5	14	963
7	3	17	6	15	9	14	1,286
8	3	17	6	15	9	14	1,286
9	1	12	9	9	0	14	1,606
Orderlies'	1	18	3	11	4	14	2,895

It will be seen that two or three of the wards are rather crowded. The space in them should be raised to that in the others by removing some of the beds.

Ventilation.—The window space in most of the wards is tolerably good, though not so large as it would be in a properly constructed hospital. Shafts have been carried from the upper wards through the roof. The lower wards require additional ventilation, by shafts carried from the ceiling above the roof. All the wards should have large louvred inlets close to the ceiling. None of the wards have fireplaces.

The Ablution and Bath Accommodation are most inconveniently situated, as is also the water-closet. Patients from the lower floor have to ascend the whole height of the house to reach them. This defect could only be remedied by removing these conveniences to suitable projections thrown out from different floors of the building, and cut off from the building by a ventilated lobby having a window on each side. In their present position both ablution room and water-closet require more ventilation. The boiler for supplying the bath with hot water is said to be too small.

The outside latrines are in a low dark building, without a door and without sufficient ventilation. They are of the usual construction and should be replaced by iron or earthenware latrines. The other defects should also be remedied.

The kitchen has a Flavel's cooking range.

Immediately outside the building at one end there is a long steep flight of steps, leading down to an immense subterranean cavern hollowed out of the porous rock. The floor of this excavation is covered with water, filtered through the stone, and affords a supply for the hospital.

This hospital affords good accommodation of a temporary kind, and, admitting its inconveniences, it is a useful building in the present very defective state of the garrison hospital accommodation. The improvements we have suggested will materially add to its salubrity at a small cost.

27.—Sanitarium, Citta Vecchia.

This establishment occupies the old "Palace of Justice" (La Corte Capitanale) of the grand masters at Citta Vecchia. It is a large building situated on the eastern edge of the high rocky ridge which traverses the island about 7 miles from Valetta. It is exposed to all the cool breezes, and enjoys a much cooler climate than the less elevated parts of the island. The palace is built with a fore-court to the street, and an enclosed court within, and is entered by a flight of steps leading up to the first floor, on which the principal suite of apartments is situated. This consists of a series of lofty rooms of different sizes connected by doors; having large windows, several of which command extensive and beautiful views. The eastern suite of rooms has a balcony running along its front, on which all the windows open.

Except on the eastern side, the palace is hemmed in by other buildings, and on the south by a lofty bastion nearly as high as its roof. There is access to this bastion from the hospital, and it forms a very good place for convalescents taking exercise.

On the upper floor are a number of small low rooms like ordinary bed-rooms, several of which have been set apart for sick. They were not occupied at the time of our inspection, and they certainly do not afford accommodation at all equal to that on the floor below.

The following table gives the accommodation as at present allotted for 88 beds :—

Number of Wards.	Regulation Number of Sick per Ward.	Dimensions of Wards.			Cubic feet per Bed.	Superficial feet per Bed.	Windows.		
		Length.	Breadth.	Height.			Number.	Height.	Width.
		Ft. in.	Ft. in.	Ft. in.				Ft. in.	Ft. in.
1	4	23 10	17 9	23 7	2,492	106	2	9 0	3 5
2	8	33 9	24 0	25 7	2,588	101	1 3	4 0 8 3	2 0 3 5
3	4	24 0	19 8	24 8	2,907	118	2	8 6	3 6
4	5	23 11	22 6	22 4	2,402	107	2	8 6	3 6
5	5	30 0	18 4	21 7	2,374	110	1 2	3 0 9 6	3 0 3 6
6	14	55 4	27 0	32 0	3,414	106	2 2	15 3 9 6	3 6 3 6
7	7	27 2	27 1	26 7	2,794	105	1 1	15 3 9 6	3 6 3 6
8	5	24 7	21 10	24 10	2,665	108	1 1	15 3 9 6	3 6 3 6
9	6	34 4	20 6	24 7	2,883	116	1 1 1	7 4 8 6 3 0	3 8 3 6 3 0
10	4	32 2	15 2	20 10	2,544	122	1 2	7 5 3 6	3 11 2 3
11	3	27 2	13 9	14 7	1,815	124	1 1	7 0 6 0	3 6 3 0
12	4	35 0	14 3	14 7	1,818	124	2	6 9	3 5
13	2	19 0	14 3	11 2	1,518	135	1 1	5 6 3 9	3 0 3 5
14	2	21 0	14 4	11 3	1,693	150	2	4 10	3 5
15	2	23 3	12 9	11 3	1,667	148	1	4 10	3 5
16	3	30 6	14 0	12 2	1,731	142	2	4 10	3 4
17	8	51 0	19 0	11 3	1,362	121	4	4 7	3 0
18	2	24 6	11 0	11 4	1,642	134	2	4 9	2 4

All the wards have ample space and superficial area for the sick ; and although some of them are better than others, the worst of them, taking their healthy position into account, are much better than the best wards in the garrison.

Ventilation.—This is effected at present by doors and windows. If these were always used there would be no need of other means of renewing the air, but as they may be shut, especially in wet weather, it would be proper to ventilate all the first floor wards by louvred inlets close to the ceilings, and by shafts carried from the ceilings above the roof, terminating in louvred turrets, and to improve the ventilation of the wards on the upper floor by shafts, and louvred inlets for fresh air.

On the ground floor is the kitchen, stores, &c. Water-closets, have been provided for the sick in proximity to the wards above. These were complained of as being offensive at times. They had been so placed, apparently from necessity, that the sick of several wards had to pass through the ward next the closets. It would be a great improvement if these closets could be removed and placed elsewhere.

This sanitarium has been of very great use to the sick of the garrison. Indeed, except the Spinola Hospital, it is the only place where fever cases have a fair chance of recovery; and it has become the custom to remove such cases to Citta Vecchia, with the certain expectation of immediate amendment. Ophthalmia and chest complaints do not benefit so much by the change as fever cases do, apparently from the too great change of climate.

We are of opinion that this sanitarium ought to be continued, and that even after the improved hospitals we have recommended are built the sanitarium will be of great service to the garrison.

28.—SANITARIUM FOR OFFICERS AT CITTA VECCHIA.

Some time ago a private house at Citta Vecchia was taken for a sanitarium for officers suffering from ill health ; but it has been little used on account of its gloomy uncomfortable appearance, and it is proposed to take another. The present building is long and narrow, and only one end of it overlooks the country, the remaining sides being completely enclosed by houses, and the rooms have no view and are deficient in light and cheerfulness. The place is never likely to be resorted to by convalescents. The house which it has been proposed to take is on the ramparts with a cheerful view in all directions, but there has been some difficulty about a few pounds of additional rent. This should be arranged, for independently of the saving in efficiency among officers by having a place they can go to for the purpose of regaining health instead of coming home, a house would be had worth the money, whereas the rent at present paid, small as it is, is money thrown away so far as any benefit is concerned.

29.—FORT CHAMBRAY, GOZO.

Fort Chambray covers the summit of a rocky hill overlooking the sea on the eastern side of the island of Gozo, above the village of Ghain Sielem. It is open to the sea breeze in all directions, and ought to be a very healthy spot. There is a very considerable unoccupied area within the works, and the barracks, which were built in the time of the Knights, are in a single cubical block at one side of the fort near the gate. During a recent earthquake, although the barracks do not appear to have been damaged, a large massive curtain close to them on the north was rent across in two places and moved outwards, so that the gun platforms sunk down several feet, on account of the whole mass of the curtain having been separated from the ground behind it.

The barracks are of a somewhat singular construction. They are in two floors, with four casemated rooms on each floor. These rooms are from 18 to 20 feet broad, from 12 to 14 feet in height, and no less than 100 feet in length. They have a single window at each end, so that the windows are 100 feet from each other. The rooms are hence more like long narrow passages or tunnels than barrack rooms. The lower rooms have doors at the ends ; the upper rooms have no separate doors, but there is an entrance in the middle of the length of each outside room, and the inner rooms are reached by corresponding doors in the division walls. Each room has regulation space for 50 men, at from 432 to 588 cubic feet, and from 36 to 41 square feet per man. The beds are arranged along the dead walls between the windows.

Besides these long barrack rooms, there are rooms for six non-commissioned officers, and three staff serjeants, constructed against the outer side walls of the outer barrack rooms. These are small, and in several floors reached by stairs. Each room has a window in the outside wall.

The following table gives the accommodation :—

Rooms.	Number of Men per Room.	Dimensions of Rooms.					Cubic Feet per Man.	Superficial Feet per Man.
		Length.	Breadth.		Height.			
No.		Ft.	Ft.	in.	Ft.	in.		
1	50	100	18	0	12	0	432	36
2, 3, 5,	50	100	19	0	14	0	532	38
4	45	100	18	0	11	7	464	40
6	50	100	20	6	14	0	588	41
7, 8	50	100	20	0	14	0	560	40

Overcrowding.— Considering the construction of these barracks, the regulation number of men is at least a third more than it ought to be.

Ventilation.—The only means of ventilation are by the end windows and some ventilating openings. But they are quite insufficient. A large shaft carried up through the middle of the length of each arch close to the piers, and above the roof, with large louvred inlets above the windows, in the manner shown in Plan XI., Figs. 1, 2, would improve the ventilation ; but it is very questionable if such rooms would ever be well ventilated unless there was a gale blowing outside.

Ablution and Bath Accommodation.—The ablution room, bath, and wash-house are all in the same detached building. There are ledges for basins, one bath, and a boiler. The refuse water runs through a drain into a ditch, and is allowed to find a way for escape.

Cook-house.—There are three cook-houses, fitted with boilers and an oven. Water has to be carried from the pump. They are drained in the same manner as the ablution room.

Latrines.—These are of the usual Maltese construction. They are drained into a cesspit in the ditch, which is cleansed out when required.

Drainage.—There is none properly so called. The surface water runs off into the ditch, and is absorbed.

Water Supply.—There are two large tanks, from which the water is raised by pumps. It is stated to be of inferior quality, and only fit for washing.

Officers' Quarters.—These are partly in the main building and partly in a separate house. They are stated to be healthy.

These barracks are rarely occupied, and we do not think it necessary to advise the usual improvements to be fully carried out until the more urgent requirements have been fulfilled at the other barracks in the command. It will be sufficient in the meantime to provide for the ventilation of the rooms in the manner suggested.

30.—Rabato Barracks.

These barracks consist of a few rooms, seldom occupied by troops, in the castle at Rabato, four miles distant from Fort Chambray. The castle crowns the summit of a commanding eminence overlooking the whole surrounding country, and must have been a grand place at one time, but it is falling rapidly into ruin. Much of it already is in a ruinous state; and there is a large angle of the works in such a condition that it may fall over the edge of the hill close to the town at any time. No repairs appear to have been undertaken since the island came into the hands of the British Government.

The barrack rooms and stores are in a better state than the other buildings, although they admit of improvement; but they are so connected with these buildings, that it is not worth while to spend money on them, unless it be considered advisable to execute such repairs as will preserve the castle itself from entire approaching ruin.

Description of Plans of proposed Military Hospitals at Malta.

Hospital Sites.

Plan No. XXVIII. shows the nature of the sites of both hospitals. The general hospital site is within St. Michael's bastion, 169 feet above the quarantine harbour, and completely isolated from the houses of the town. Its area is about $2\frac{1}{4}$ acres, much too small if the hospital were in a town where it could be encroached on and surrounded by buildings, but as it overlooks all the country, the extent of ground, so far as ventilation is concerned, is indefinite. The site is on the highest ground within the lines, and freely exposed to all healthy winds, which at Malta blow from the north and north-west directions. There are no nuisances of any kind near it. The position is the reverse in every point affecting health to that occupied by the present general hospital, and no healthier one could be obtained in this part of the island.

The site proposed for the Cotonera hospital is close to the outer line of works at the southern side of the Cotonera lines, overlooking the open country. The position is entirely open and isolated from all houses. It is at a considerable height above the sea level, and, like the site of the proposed general hospital, is freely exposed to all healthy winds, although, from the extent of bare stony ground in the neighbourhood, it is not likely to be so cool.

The sites are the best which exist within the divisions of the fortress where the hospitals are intended to be placed.

Plans of the General Hospital, Valetta.

Plans XXIX., XXX., and XXXI. show the proposed arrangement of parts in the general hospital. On plan No. XXIX. is shown the outline of St. Michael's bastion, the form and area of which have determined the entire plan. The pavilion construction which has been adopted in this case, in conformity with the recommendation of the Royal Commission on the sanitary state of the army, is so flexible that it has readily adapted itself to the necessities of the ground without any essential sacrifice of its special advantages. The area within the bastion is not large enough for a hospital for 300 sick, and it will be necessary to obtain possession of some houses where the front of the administration is to be placed. This being done the whole of the administrative part of the hospital will be kept separate from the sick wards, and thus the important principle in hospital construction of keeping the sick by themselves, and the administrative offices and quarters by themselves, will be realized.

There is some difference of level between the two ends of the ground, and it will be necessary to go some depth for a foundation. We propose to take advantage of this to obtain space, in light, airy, arched basements, some of them above the level of the ground for the pack store and for all the hospital stores, medical and purveying, required for this important station, and also for the orderlies' dining room, &c. The kitchen will be quite detached from the hospital on a lower level, and the diets will be raised to the different floors by a lift. All the ground floors will be on a level.

The sick wards are on two floors only, and the administrative block consists of two floors and a mezzanina.

The wards are in six pavilions, 50 feet apart. Each ward is 16 feet high, and, as the roofs are flat, the height of wall will be about 35 feet. The distance between the pavilions, 50 feet, would be too little for this height at home stations, but in such a climate as that of Malta, and in so exposed a situation as the building is intended to occupy, it will be sufficient for health. The plan shows that this element of distance has been determined by the form and area of the bastion.

These fixed conditions have also rendered it necessary to have the pavilions of different lengths, which is an advantage in so far as it enables wards of different sizes to be obtained.

The larger wards, exclusive of the space at the end, are intended to be 110 feet long by 28 feet broad, and to contain each 32 beds, which, with the height, 16 feet, will afford 1,540 cubic feet, and $96\frac{1}{4}$ square feet per bed.

On each side the ward entrances are placed a nurses' room and scullery, with small windows into the wards, and at the opposite extremity of the wards are the baths, lavatories, and water-closets, in separate projections, with ventilated lobbies and windows so arranged that in whatever way the wind may be blowing, any effluvia will be carried away from the wards. The compartments in which the water-closets are placed should be lined with glazed tile for the sake of cleanliness. Between these two end projections is an open space and a large window with a balcony overlooking the sea, where convalescents may find recreation and fresh air. There will be sufficient space for convalescents taking exercise in the sheltered areas of ground between the pavilions.

The operation theatre is on the upper floor of a detached pavilion, the ground floor of which is occupied by two single-bed wards to be appropriated to the care of noisy patients, and there are other two single-bed wards to meet any special emergency. The dead house and postmortem room are in arches under the north-east end of the corridor, quite away from the wards, and having their own entrance from the street outside.

All the pavilions are connected on both floors by an open arched corridor sufficient to afford shelter from sun and rain without interfering with the free circulation of air about the pavilions.

As already stated, the kitchen is outside the buildings altogether. No washhouse is required, as the hospital washing is all done by contract at a distance.

The administrative block is 35 feet from the ends of the wards, and there is a court 20 feet wide between it and the open arched corridor. It is connected for facility of administration by three separate stairs and passages with the hospital corridor.

On the ground floor are placed the porter's lodge and guard; the waiting room, surgeon's room, dispensary, quarters for the orderly medical officer, and for the captain of orderlies, the commandant's, purveyor's, paymaster's, registrar's, and captain of orderlies' offices.

In the mezzanina there are quarters for non-commissioned officers and orderlies, officers' servants, and kitchens.

On the upper floor at the north-eastern end are quarters for the superintendent of nurses and for female nurses, together with the clean linen stores and mending room, and in the south-western end are the commandant's quarters and a large day room for convalescents, with a non-commissioned officers' room attached to it for discipline.

Each division of the administrative building has its own separate means of communication with the hospital.

A large archway for carriages and ambulances is carried across the middle of the administrative block, and over the arch is the chapel, connected with the hospital corridors by stairs.

The area of ground is so limited that it has been impossible to find quarters for any officers except for those who must reside by regulation within the hospital precincts; these are the Commandant, the orderly medical officer, the captain of orderlies, dispenser, superintendent of nurses, together with non-commissioned officers and men of the army hospital corps. The required offices for all classes of officers are provided in the plan, but all the officers except those we have named will have to be quartered elsewhere.

We propose to introduce a very important improvement in the construction of both hospitals besides fire-proof flooring. A great disadvantage of the Malta building stone is its very porous character, absorbing rain in large quantity, especially if impelled against the walls by a strong wind. This gives rise to long continued dampness, which is very apt to penetrate to the interior of buildings. Besides this, the summer sun is so powerful that its heat penetrates walls of ordinary thickness, and all exposed buildings require verandahs to adapt them to the climate. This construction, besides its costliness, when applied to hospital buildings, tends to interfere injuriously with the internal ventilation, and with free external circulation of air. We propose to avoid both damp and heat by constructing the walls and roofs double, with a free passage for air between them, and to use properly constructed jalousies and shades for all windows exposed to the sun.

The necessary means of communication between the different parts of the building are all under cover.

The best material for flooring would probably be the hard Maltese limestone, well oiled and polished. The soft sandstone is unsuitable on account of dust, and it is doubtful whether wood flooring would not harbour vermin.

Plan of Cotonera Hospital, No. XXXII.

This building is an adaptation of the pavilion construction to infantry regimental hospitals now being built on our plans for home stations. It consists of two end-to-end pavilions, similar to those of the general hospital, with the same arrangement of orderlies' rooms, sculleries, baths, and water-closets. It will afford the same amount of space per bed for sick. The hospital will be in two floors, and will accommodate 136 beds. There are four small wards, two on each floor, of two beds each for special cases. In the centre on the ground floor are placed the waiting room, surgery, hospital serjeant's quarter, and a room for orderlies. On the upper floor there is another orderlies' room and a day room for convalescents. The kitchen and stores are all in an outbuilding behind the hospital, so that there is nothing in the hospital proper except the sick and what is immediately required for their treatment and nursing. The front of the hospital is in the shade from its position, and the means of communication between the hospital and outbuildings are under cover. The walls and roof will be double, with ventilation between, as in the general hospital. The windows will be jalousied and shaded from the sun. The exercising ground for convalescents will have to be provided on the shady side of the buildings.

Ventilation and Warming.

In both hospitals the windows will be carried up to within a foot or 18 inches of the ceiling, and the upper portion will open by a pulley and cord, so as to fall inwards like a louvre, and to throw any strong air currents up towards the ceiling. Swing doors, the upper panels of plate glass, for purposes of inspection, are required. Air shafts for removing vitiated air will be carried up in the spaces between the windows and from the corners of the wards to above the roof, and there louvred or otherwise protected to prevent rain beating in. The lower ends of the shafts within the wards will also be louvred, to throw any descending air currents up towards the ceiling. These shafts will be placed in each alternate space between the windows, and in the alternate spaces where there are no shafts there will be placed inlets for fresh air close to the ceilings.

The conjoined sectional areas of the shafts will be equal to one square inch for every 25 cubic feet in the upper floor wards, and one square inch for every 30 cubic feet of the lower floor wards. The conjoined area of all the fresh air inlets will be equal to one square inch for every 30 cubic feet of contents of the wards.

Every room, apartment, office, store, scullery, water-closet, ablution room, &c. within the hospitals should be ventilated in the same manner, and with the same proportionate areas of shafts and inlets. The kitchen will be as freely ventilated as may be required to keep it cool. Coolness is the only test of kitchen ventilation in Malta.

Although the climate of Malta has a high summer temperature, there are times in winter when fires are necessary for comfort. This is especially the case with sick and convalescents, and the existing hospitals are accordingly warmed by stoves. We would propose to continue this practice in the new hospitals, and to make use of a new stove for warming fresh air by surfaces of fire-brick for the purpose. This would be quite sufficient, because the use of these stoves would be only occasional, and they could be entirely removed in summer. Two such stoves for each of the larger wards and one for each smaller ward would be sufficient.

Drainage, Water-closets, Latrines.

Every part of both hospitals will be drained to an outlet by glazed earthenware pipes. Each larger ward will have three water-closets of the best construction, and one water-closet sink. The syphons will all open into a vertical earthenware pipe, trapped at the lower end, where it is connected with the drain and open at the top, which will be carried above the roof of the buildings, and covered there by a grated box filled with charcoal. This arrangement will prevent the possibility of sewer gas entering the hospital, and any foul air escaping from the sewers will be discharged at the upper end of the pipe through the charcoal, which has the property of destroying all the organic matter the foul air may contain.

The orderlies' latrines should be outside the buildings, in such a position as not to be injurious. In outside latrines Macfarlane's or Jennings' apparatus would be the most suitable.

Each ward requires a water urinal in the same compartment as that in which the ablution table is placed.

The outlet pipes from the baths and ablution basins and from the sinks in sculleries will be discharged into a similar pipe trapped at its lower end where it enters the drain, and open at the top above the level of the roofs.

The ground immediately under the walls of the hospital should be carefully flagged and channelled, to convey the rain water speedily to trapped gulleys communicating with the general drainage of the buildings.

Water Supply.

The water supply for the proposed general hospital would be most conveniently derived from the aqueduct. It would have to be raised to cisterns, from which it should be laid on at pressure to all the water-closets, sinks, baths, and lavatories. Hot and cold water should be laid on to the scullery sinks, and also to the baths and wash-hand basins.

Water for the Cotonera hospital might be obtained from another aqueduct at no great distance from it. It should be laid on hot and cold all over the buildings.

The roof water of both hospitals would be of considerable amount, and might be passed through filters into tanks for use.

Ablution and Bath Accommodation.

Each large ward should have three ablution basins sunk in slate or marble slabs, with taps for warm and cold water. The baths should be of glazed terra cotta or of marble. The latter material is said to be the cheaper for such purposes in Malta.

Hospital Kitchens.

The buildings should have plenty of light and ventilation. The best cooking ranges would be one of Benham's or Radley's, specially constructed for hospital cooking.

Proposed General Military Hospital, Valetta.—Plans XXIX., XXX., XXXI.

Reference.

Ground Floor:—
A. Wards for 32 beds.
B. Ward for 16 beds.
C. Ward for 8 beds.
D. Small wards.
E. Water-closets and ward sink.
F. Lavatory, bath, and urinals.
G. Nurses' room.
H. Ward scullery.
I. Corridor.
J. Courts.
K. Exercising grounds.
L. Entrance gateway.
M. Principal staircase.
a. Purveyor } offices.
b. Paymaster }
c. Apothecary } quarters.
d. Orderly medical officer }
e. Clerk.
f. Captain of orderlies quarter.
g. Guard.
h. Orderlies' stairs.
i. Registrar.
j. Dispenser.
k. Porter.
l. Governor's office.
m. Waiting room.
n. Surgeon.
o. Water-closets and bath.
p. Nurses' stairs.
q. Lifts.

Mezzanine Floor:—
a. Cook's room.
b. Officers' kitchens.
c. Commandant's stairs.
d. Serjeant major.
e. Officers' servants.
f. Store.
g. Bath.
h. Lavatory.
i. Serjeant.
j. Orderlies.
l. Orderlies' stairs.
o. Water-closets and urinals.
p. Nurses' stairs.
q. Lifts.

Upper Floor:—
A. Wards for 32 beds.
B. Ward for 16 beds.
C. Ward for 8 beds.
D. Small ward.
E. Water-closets and ward sink.
F. Lavatory, bath, and urinal.
G. Nurses' room.
H. Ward scullery.
I. Corridor.
a. Convalescents.
b. Commandant's quarters.
c. Commandant's stairs.
d. Chapel.
e. Servant.
f. Kitchen.
g. Nurses (dormitories).
h. Mending room.
i. Linen nurse.
j. Day room.
k. Superintendent of nurses.
l. Clean linen.
m. Operating theatre.
o. Water-closets, bath, and sink.
p. Nurses' stairs.

Proposed Hospital at Cotonera.—Plan XXXII.

Reference.

Ground Floor:—
A. Ward for 32 beds.
B. Ward for 2 beds.
C. Nurses' room.
D. Ward scullery.
E. Bath, lavatory, and urinal.
F. Water-closets.
G. Water-closet and sink.
H. Water-closet and urinal.
I. Orderlies.
J. Hospital serjeant.
K. Waiting room.
L. Surgery.
M. Covered way.
N. Kitchen.
O. Scullery.
P. Cook's room.
Q. Medical comforts.
R. Utensil store.
S. Beer cellar.
T. Larder.
U. Orderlies' bath and lavatory.

First Floor:—
A. Ward for 32 beds.
B. Ward for 2 beds.
C. Nurses' room.
D. Ward scullery.
E. Bath, lavatory, and urinal.
F. Water-closets.
G. Water-closet and sink.
H. Water-closet and urinal.
I. Orderlies.
K. Day room.
L. Bedding store.
M. Clean linen store.
N. Pack store.
O. Assistant steward.

PART IV.—BARRACKS AND HOSPITALS IN THE IONIAN ISLANDS.

Of the islands belonging to the Ionian Republic, the seven following contain the principal military stations:—

Corfu, including Vido.
Paxo.
Santa Maura.
Ithaca.
Cephalonia.
Zante.
Cerigo.

With the exception of a few small out-stations, we have examined the barracks and hospitals in the first six islands. Cerigo is the only one which we did not inspect, because on examining the documents regarding it which were put into our hands at Corfu, we found that the barracks on the island admitted of no improvement, and that nothing short of entire rebuilding would render them habitable. Plans II. and VI., for erecting new barracks, including every necessary improvement, were prepared at the War Office and examined by us, before being authorized, and if carried out the small garrison at Cerigo would have the best barracks in the command. We shall, therefore, confine our report to the barracks and hospitals in the first six islands, beginning with Corfu.

I.—CORFU AND VIDO.

1.—Topography and Climate of Corfu and Vido.

The island of Corfu is about 40 miles in length, by 17 miles in its greatest breadth. Its eastern side runs nearly parallel with the west coast of Albania, at a distance varying from about two miles to above seven miles. The whole of Albania, as seen from Corfu, presents a succession of lofty mountain ranges, intersected by valleys, exercising a material influence on the climate of the island, in summer and winter, according to the direction of the wind. The general aspect of Corfu itself is hilly, with bold ranges or single mountains rising to elevations of between 2,000 and 3,000 feet above the sea level. The hilly district of the island is its northern extremity. The south end is of much lower elevation, and has no protection from the sirocco winds, which are much felt during the season.

The geological structure, especially about the town of Corfu, consists of tertiary formations resting on secondary rocks, and all lower slopes and valleys are covered to some depth with loams and clays; capable of the highest cultivation, but chiefly covered with olives.

The town of Corfu is situated in latitude 39° 37′ N., longitude 19° 56′ E., on a peninsula, bounded on one side by Castrados bay, and on the other by Corfu harbour, which forms part of a deep bay running into the island for some miles west of the town. The island of Vido is in this bay, at the distance of a mile from Corfu and four miles from the coast of Albania.

The ground in the immediate vicinity of the town, as shown on Plan XXXIII., is undulating, and presents a number of detached eminences with valleys between them. The highest point is the top of the citadel, 231 feet above the sea. The eminence on which Upper Fort Neuf barrack is situated is 186 feet high. The average level of the town of Corfu is about 40 feet above the sea. Along the shallow margins of the bays at the foot of the heights there are considerable tracts of undrained malarious land. The most important of these are in the vicinity of Govino harbour at the upper end of the bay of Corfu, and 4½ miles from the town, the marshy ground at the mouth of Potamo river, two miles from the town, and the low ground at Manduchio and Castrados, within little more than half a mile. There is besides a large tract of salt marsh at the head of the salt water lake Calikiopulo, about a mile distant from the town.

The general character of the island is that of great productiveness, in which nature has done everything, and man little or nothing. While every country in Europe has been improving its agriculture, Corfu appears to be at a standstill. The drainage in all the districts we visited is most defective, or rather there is none, and so the very first step for improving the general healthiness of the island and for increasing its produce has yet to be taken. Intermittent and remittent fever, as we shall presently show, prevail among the inhabitants in consequence of this and other sanitary neglects, and we met with numerous instances of well marked malarious aspect among the people in places which ought to be healthy. In no part of the island, within any distance of the garrison likely to influence the health of the troops is there any source of malaria which cannot be greatly diminished, if not rooted out. The natural means of drainage are ample, and even the low sea margins can be drained or filled in, as is being done at Cephalonia. There is nothing in the topographical features of the surrounding country which ought to be a source of ill health. All that is required is the intelligent application of means; but neglect of these means will infallibly produce disease in such a climate.

The island of Vido lies within the bay of Corfu. It is of an irregular angular form, a mile broad at one end, and tapering to a point at the other. Its length is about a mile and a half. The surface is hilly, and is formed by a ridge extending the length of the island, with spurs projecting from it at the broad end. The highest point is 137 feet 6 inches above the sea. The parade ground of the fort is 95 feet above the same level. The nearest marshy ground is at the mouth of the Potamo, three miles distant to the west. Its extent is about 120 acres. There is marshy land in one of the bays of the Albanian coast at a considerably greater distance, but there is no satisfactory evidence that this affects the health of the troops in garrison. It was stated to us that in one house situated in a narrow valley below the level of the fort remittent fever had appeared, but the site occupied by the house is sufficient to account for this occurrence.

The underlying rock is limestone, covered by a thin stratum of soil, which is said to become almost glutinous in wet weather but is hard in dry weather. There is no cultivation, very few trees, and no shade. Under vegetation is extremely abundant and active in spring, when heavy dews fall. The large amount of decomposing vegetable matter produced by it is not conducive to health, but lately this has been burnt in summer with salutary effect.

Being surrounded by the sea, and exposed to all winds, there is a free external circulation of air. The wind is sometimes very violent during the winter months, and when wind is accompanied by rain, wet and damp become very penetrating. Some new brick huts lately erected have had the rain driven through the bricks so as to wet the interior.

The climate generally of Vido is the same as that of Corfu about to be described, except that the cooling influences of cold winds and sea breezes are more felt. Hence there is perhaps greater variability, exercising greater influence on diseases of the chest and on rheumatism.

There is no population on the island except the garrison and that connected with it, about 700 persons in all.

Climate.—The elements of the climate of Corfu, so far as we have been able to obtain them, are given in Appendix No. 1 for five years, 1855 to 1860. They show very hot summers with mild winters, and considerable variability.

The mean monthly maxima of temperature for June, July, and August are 86°·7, 93°·9, and 93°·1. The mean monthly minima for December, January, and February are 46°·8, 43°·6, and 48°·6. The summer temperature may be said to vary between 70° and 94° nearly, and the winter temperature between 43½° and 74½°. The mean monthly variation is highest in December, when it amounts to 20°·1, and lowest in February, when it is 12°·5. Although the heat is tempered by cool northern winds, the climate is somewhat extreme, and the variations are often sudden, requiring care in clothing and exposure. During hot weather, light loose clothing is requisite in this, as in all the islands, with flannel next the skin, and the want of such a change in dress has often been seriously experienced.

The rainfall, as given in the table, is above 51 inches per annum.

As regards its influence on health, the climate is considered very favourable from October till May, after which period it becomes hot and very oppressive, especially during the sirocco. It is then considered debilitating, producing a sensation of burning heat and oppression of the chest, accompanied with languor and a propensity to perspire on the slightest exertion. But in this as in similar cases where the sensible effects of climate are sure to be observed, and the influence of local causes, called into activity by the increased heat and moisture, are almost as certain to be overlooked, it is not easy to say what kind and extent of influence is really exercised by the simple elements of heat, moisture, and variability, *per se*. It is quite certain that in the present neglected state of the drainage and cultivation of the island of Corfu, more especially of that part of it about the town, and in the neglected state of the town itself, there are elements of unhealthiness sufficient to account for any local diseases which may show themselves, quite independently of climate. Under the influence of high temperature, moisture, and variability, local conditions become of far more importance than they are in such a climate as that of England; but the fact is by no means sufficiently recognized, either at Corfu or in any other of these islands.

2.—Mortality and Diseases of the Native Population.

The Table, Appendix No. 2, gives the mortality and fatal diseases among the population of the town and suburbs of Corfu for six years, from January 1st, 1855, to December 31st, 1860.

The population amounts to 26,012, distributed as follows:—

——	Males.	Females.
Town - - -	9,245	8,454
Suburbs - - -	4,501	3,812
Total - -	13,746	12,266

The average mortality among the same population during three years was 474 males and 401 females, including an annual average of 36 premature and still births, which being deducted would leave 839 as the mortality from disease and old age. This mortality includes its proportion of the cholera epidemic of 1855, which cut off 448 of the population in that year: but the epidemic may be fairly reckoned as due to bad sanitary conditions, and ought to be included in the legitimate mortality of the population. During these six years the average annual death-rate was 32·2 per 1,000, (or, excluding the cholera, about 30 per 1,000,) a rate indicating a high degree of local unhealthiness among so small a population.

On examining the causes of death, we find tubercular diseases, such as consumption, mesenteric disease, scrofula, atrophy, &c., occasioning upwards of 28 per cent. of the mortality. The zymotic class, including fevers, diarrhœa, dysentery, cholera, &c., occasion about 16 per cent., and diseases of the chest, including consumption, about 24 per cent. of the mortality.

There are several omissions in the return which lead to doubts as to the state of registration of deaths in the island. Thus there are in these six years no deaths reported from small-pox, scarlet fever, or measles, while the troops in garrison have certainly not enjoyed a similar exemption from this class of diseases.

In order to ascertain the nature of the more prevalent diseases, we obtained the return, Appendix No. 3, showing the admissions, deaths, and diseases, in the Civil Hospital, Corfu, during a period of six years, 1855–60.

This table shows that chest diseases afforded 16 per cent. of the admissions, and 29 per cent. of the total deaths. One-half the mortality from chest diseases was attributable to consumption. Fevers of various types give upwards of 15 per cent of the admissions; not a very large proportion; and 7½ per cent. of the mortality, one-half of the fever mortality being due to typhoid fever. The table also shows the nature of the local fevers. It shows that out of 464 admissions from fever, 214 were due to intermittent, nine of the cases being "pernicious." Twenty were due to typhoid fever, of which 12 terminated fatally. There were eight cases of adynamic fever, of which five died. There were 174 admissions from rheumatic fever.

By making use of the data afforded by the mortality and hospital returns, we learn that the most important diseases among the native population are tubercular diseases, fevers, and bowel affections. It is impossible to say how far tubercular degeneration may or may not influence chest and abdominal diseases generally; but from the extent to which a deteriorated state of constitution exists among the population, as shown by these returns, it is not at all improbable that many cases of diseases of the chest and abdomen are more or less the result of tubercular disease. There is enough, however, in the changeable character of the climate, at certain seasons, to account for much of the acute chest and rheumatic disease existing. But we must look elsewhere for the causes of that generally deteriorated stamina, the existence of which among the population is indicated by the statistics.

We next proceed to give a brief sketch of the sanitary condition of the town and neighbourhood, to which the mortality table refers.

3.—Sanitary Condition of Corfu.

We have already referred to the general neglect of anything like agricultural drainage as likely to influence the public health in such a climate; but when we examine the condition of the town and neighbourhood, by which the health of the garrison is likely to be more affected than by the state of the country, we find a condition of things in comparison with which the absence of agricultural drainage is a very small matter indeed.

Never, in the whole course of an extended experience, have we met with any places so thoroughly neglected as the town of Corfu and its adjoining villages. To come upon them, as we did, from Malta, was like retrograding centuries in civilization. Malta, as we have shown, is by no means all that it ought to be, and will be, but the worst spots of Malta are better than the best spots in Corfu, excepting only the newer portion of the town, close to the esplanade.

The town covers the ridge of ground between Corfu harbour and Castrados bay. It is irregularly built, and its houses appear to belong mainly to the time of the Venetian possession. Except one or two newer streets, all the densely peopled part of the town consists of narrow alleys, with a few wider streets among them, running in various directions, without order, and not admitting of free ventilation. The ground on which the houses are built is on different levels, falling generally towards the harbour, in the neighbourhood of the Custom House, where much of the drainage of the higher levels is concentrated. Except a small area in this locality, the levels would admit of the freest fall for drainage. Indeed, along the whole northern face of the town towards the harbour there is a vertical precipice 40 to 50 feet in height, above the level of which the town is built. The fall on the south side towards Castrados bay is perhaps greater, though more gradual. Any way the fall is much more than is required for the most efficient drainage. So far, then, as concerns local position, this town might, under enlightened municipal administration, become one of the healthiest and finest in the Levant, worthy of being the capital of one of the most beautiful and fertile of the Mediterranean islands. At present it is the reverse of all this. No doubt, in Corfu as in every other place under the sun, there are difficulties in the way of improvement; but they are not a whit greater than have to be met elsewhere. There is an old, irregularly built, and in many parts a badly built town to be opened up and reconstructed. There are old houses of a bad, close, unventilated construction, overcrowded with people, and most of those we saw in a very filthy condition, without any of those domestic conveniences which have been long in use in other parts of Europe, and obviously under no efficient sanitary superintendence or regulation. The atmosphere almost everywhere foul and offensive. The street cleaning, as we saw it, was carelessly and badly done, the paving and guttering generally inferior, and often irregular and very bad. Gutters, where they did exist, sometimes having cesspool matter lying in them opposite the doors and windows of houses. The drainage as bad as possible, and in most streets making things worse than they would otherwise have been. There may be some excuse for not opening up new streets, but in the midst of such natural prosperity as the island of Corfu presents, there can be no excuse for such neglects as we have barely indicated, except ignorance of how these things degrade the health, morals, and productive power of the population.

All this is well understood elsewhere, and we have spoken strongly about it in the hope of inducing those persons who have undertaken municipal duties to inquire what their responsibilities towards their poorer fellow citizens really are, with the view of acquitting themselves of them.

Beyond the limits of the town, but sufficiently near to affect the purity of the air in certain seasons and winds, is the low, undrained, filthy village of Manduchio, lying immediately west of Fort Abraham. Still further in the same direction is the low, undrained land at the mouth of the Potamo, already mentioned. On the south side of the town is the village of Castrados, built on a swampy sea margin, without drainage, and in most parts extremely filthy. The large extent of salt marsh, already mentioned, at the head of the lake of Calikiopulo, also affects the health of the district in its neighbourhood. These very obvious sources of ill health are all remediable or removable. It is a mere matter of very ordinary sanitary engineering, presenting no unusual difficulties, and the cost of which would be far more than repaid in improved health and improved value of land and other property.

Town Drainage.—So far as we could ascertain, the drainage is chiefly on the surface, and there are few efficient main sewers. In the villages the drainage is by foul open ditches. There is no house drainage and few or no waterclosets, except in houses frequented by people from England. The usual practice appears to be to throw the excreta into the streets or gutters, or to have some sort of bad, unwholesome privy communicating with an open drain within the house, often in the kitchen, into which all slops are thrown. Many people resort to the out-skirts of the town, and the air is infected by this abominable uncivilized habit.

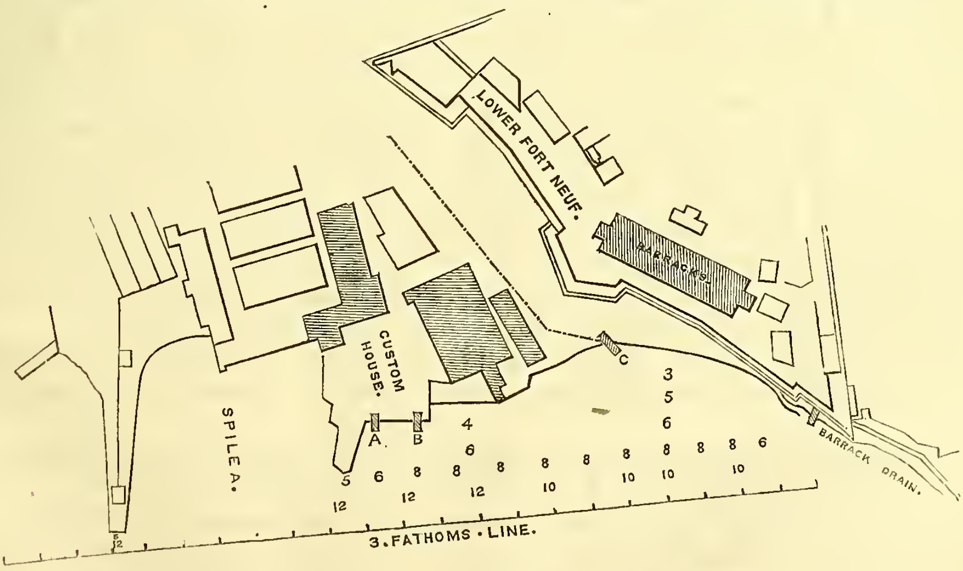
The Central Commission of Health, as will be seen by their Report, Appendix 4, had their attention called to the state of the drainage by the inhabitants of Manduchio, on account of the numerous miasmatic cases of disease by which the village was infested. This memorial led to an inquiry into the general state of the drainage of the town and suburb, by direction of the Lord High Commissioner; and the Report, dated the 27th September 1860, states briefly the nature of the defects and the class of remedies suggested. The practical result of their inquiry is, that a proper system of drainage, both public and private, for the town and suburbs, as well as for the houses, is a matter of urgent necessity, and ought to be carried out without loss of time, but nothing has been done. It would certainly be better to do nothing except to secure a good surface drainage and a proper system of cleansing than to construct sewers or drains similar to those which have been laid down in times past. They are opposed to every sound principle of construction, and they are dangerous to public health.

What is really required is, that a survey be made by a competent sanitary engineer, and a plan and estimate for a complete system of sewerage and house drainage prepared, and on that plan and estimate the work should be proceeded with and completed as speedily as possible. The chief difficulty would be in providing suitable domestic conveniences, in consequence of the prevalence of uncivilized habits among the population; but no doubt this difficulty could be overcome. At all events, there is abundant choice of contrivances in use in England suited to every condition of life. None of them are costly, and, with a little attention, all are effective, according to their construction. They have been brought successfully into use under circumstances as unfavourable as any which exist at Corfu.

The execution of these sanitary works will require time, but there is one work of immediate importance to the health of the troops as well as to the health of the population near the Custom House, which should in some way or other be at once attended to, and that is the condition of the drainage outlets at the Custom House wharf. We have already stated, that the vicinity of this wharf, being close to the sea level, the town drainage gravitates towards it, and is there discharged by three outlets into a small bay about 200 yards across, and from 80 to 100 feet wide, lying between the end of the Custom House quay and the rock to the west of Lower Fort Neuf barracks. The outline of the ground and position of the sewer outlets are shown in Fig. 22, as well as the depth of water into which the sewage is discharged.

The letters A, B, C, and the outlet marked "barrack drain" show the position of the sewer mouths. The figures within the three fathom line show the depths of the water in feet as ascertained on special survey.

Figure 22.—Sewer Outlets into Shallow Water at Lower Fort Neuf.



It will be seen that the drains open into an expanse of still, tideless seawater, from three to four feet only in depth. The temperature both of the air and water is high, and decomposition proceeds very energetically; besides which, the bottom is covered with sewer deposit, constantly giving off foul gases, and whenever boats pass through the shallow water, which they do every minute of the day, the mud is stirred up and gives off the most offensive odours. We have ourselves had experience enough of the great nuisance in passing through this belt of water. The smell from it pervades the whole neighbourhood, occasioning attacks of illness among officials and others employed along the shore. At times the effluvia pervade Lower Fort Neuf barracks, which directly overlook the nuisance, and we have no doubt that the liability to fever among the troops occupying these barracks is partly to be attributed to this circumstance. Apart from injury to health, the nuisance is so great at times that it is not right that either officers or men should be exposed to it; and if it really were impracticable to remedy this mischief, we should have no hesitation in recommending that the barrack be abandoned. But this is not required. The evil could be easily remedied by carrying the outlets, either separately or conjoined, into deep water.

The plan shows that there are three fathoms water at about 150 feet from the outlets, clear of the end of the quays, into which the sewage could be carried by means of iron pipes at a very trifling cost in comparison to the advantage which would follow from the work.

Connected with this same nuisance is the state of the foreshore, on which all kinds of putrid matter is washed up and left to decompose in the sun.

This can only be remedied by running a quay along it, in deep water, a work which would reclaim some valuable land and quay space, where it is much required, out of a surface of shore and water which is at present an intolerable nuisance. If this were done, improvements in the sewer outlets could be carried out at the same time.

So urgent do we consider this work for the health of the troops in lower Fort Neuf barracks, that should any difficulties arise with the authorities as to the cost of the work, we would recommend that the War Office should at once execute it out of the War Office funds, and ask for the repayment of one-half the cost from the town.

Surface Drainage, Paving, and Cleansing.—These sanitary works are in a rude state in many parts of the town. The surface is uneven or broken, and the channelling not sufficient for carrying off the water rapidly. Hence, also, the cleansing is by no means good. The paving is better than it is in some other Levant towns, but not at all to be compared to the paving of Valletta. It is not sufficient for health. In improving the paving, properly squared stones should be used, and the joints should be laid very close, the water channels should be formed with great care, and all courts and passages should be flagged.

Water Supply.—While expressing freely our opinion on the sanitary neglects presented by the town, we are glad to find one thing of which, up to a certain point at least, we can approve, and that is the water supply. The approval must, however, be limited to the fact that a considerable supply of water has been brought a distance of seven miles in pipes and conduits, and distributed more or less satisfactorily to the houses. The work was undertaken at the instance of Lord High Commissioner Adam, and was executed for the municipality and garrison, under the superintendence of the present Surveyor to the War Department, Mr. Mennie. It would have been amply sufficient for all purposes had the purity of the sources from which the water is drawn been equal in efficiency to the engineering skill displayed in the design, and had the local authorities connected their water supply with a proper system of house and street drainage. At the time the scheme was proposed less attention was bestowed on water sources than is now the case, and springs were selected without any sufficient analysis or inquiry into the sources of the water. The first intimation which was received of any fault in the water was the partial blocking up of the pipes by corrosion of the iron, and by deposit of crystallized carbonate of lime in the leaden branches. These occurrences led to an inquiry, only now completed, and which has shown the danger of selecting water for towns without a careful preliminary analysis.

The history of the water supply, so far as it is necessary for our purpose, is contained in Appendix 5, which also gives a chemical account of it from Mr. Abel, Woolwich.

Part of the water issues from the springs of St. Nicolo, and is collected into a stream, which, after driving eight flour mills and getting much fouled in its progress through them, is joined by another stream from the reservoir of Carteri, which is supplied by a spring. The conjoined waters then pass through a filter to a brick barrel drain, conveying the water to another filter, through which it is passed into the reservoir of Perama, and thence by two lines of 9-inch iron pipe, one for the higher and the other for the lower districts of the town.

As already stated, the obstructions in the pipes led, for the first time, to a proper analysis being made by Mr. Abel, and the following are the contents per imperial gallon:—

—	I. San Nicolo Water taken at its source at the Junction of all the small Springs.	II. San Nicolo Water after its passage through eight miles.	III. Water of the Spring of Carteri.	IV. Water of the United Springs of Carteri and San Nicolo in the state it falls into the Reservoir at Parama.
	grs.	grs.	grs.	grs.
Carbonate of lime - -	12·99	12·60	16·52	14·00
" magnesia -	3·02	2·20	1·79	1·53
Sulphate of lime - -	6·85	6·66	13·33	8·96
" magnesia - -	3·68	2·85	8·39	6·80
Chloride of sodium - -	1·37	1·25	1·99	1·48
Oxide of iron and alumina -	0·42	0·30	—	trace
Organic matter - -	2·24	2·00	2·38	1·80
Total solid constituents, (direct estimation) -	30·58	29 96	44·40	34·80

This analysis shows that all the waters are bad and hard, to such an extent as to partake of the character of mineral waters. The amount of carbonates, apart from the sulphates, would alone constitute these waters very expensive for use, merely from the waste of soap and linen in washing.

The sulphates vary from 9½ grains to nearly 22 grains per gallon, being from three to seven times the amount which has led (in the case of Liverpool) to the rejection of waters of this class for town use. The inevitable result in the present case is obstruction of water pipes, increased cost for washing and for wearing apparel, and imperfect cooking, for sulphates harden all tissues, animal and vegetable, boiled in them. They are likewise injurious to digestion. The San Nicolo water is stated to be so dirty for eight months of the year that it is not used; and during the whole of that period the Carteri water, with nearly 22 grains of sulphates per gallon, is had recourse to.

The best thing to do under the circumstances would be to make a fresh survey of all the water sources near which the aqueduct passes, to have these sources carefully examined and their waters analyzed. The best sources should be selected and substituted for the present springs. The Carteri spring should be the first rejected, because it is the worst, and afterwards the San Nicolo springs. The cost of a few miles of additional piping, if necessary, to effect the change, is nothing when compared with the advantages of obtaining softer and better water. In all probability there is a deposit of gypsum in the strata whence the water comes.

If no better water can be obtained, it would certainly be worth while to introduce Dr. Clark's softening process by means of lime, as suggested by Mr. Abel. This would diminish, but it would by no means remedy the evil. The process is very simple but it should be entrusted to competent hands.

The quantity of water varies with the season, but the mean is given in the Report, Appendix 4, at 324, 250 gallons per day, which would afford 7 gallons per head a day to above 46,000 people. The supply is therefore ample as to quantity.

The distribution is effected by iron branch pipes of from two to four inches in diameter, and by three-quarter inch leaden pipes, by which the water is carried to the consumers. The total number of water taps in the town and suburbs, both for public and private use, including 100 for the troops in the Citadel, is 1,382.

The question as regards water supply may be summed up as follows:—

1. The method of collecting and bringing the water to the town is correct in principle and well carried out.

2. Although partly laid on to the houses for ordinary use, the water supply is not turned to proper account for waterclosets or other improved domestic appliances, nor for cleanliness.

3. There is no proper connexion between the water supply and drainage either public or private, and were the water ever so unexceptionable, it would, in the absence of proper house and street drainage, only amount to half of a sanitary improvement. Works of water supply and drainage should always be planned in relation to each other and carried out together.

4. The quality of the water is so inferior as to render improved sources of water supply necessary.

Nuisances.—Nuisances abound in all directions both in the town of Corfu and in the villages and suburbs. Even the sea is not kept free of them, for the public and commissariat slaughter-houses are placed on its margin between Fort Neuf and Fort Abraham, and all the blood and offal are poured into tideless shallow salt water under a hot sun, where the putrid matter remains, or is deposited on the neighbouring shores, until it is decomposed away, producing the most abominable nuisance wherever it reaches. There is no excuse for this. The whole of the matter should be put to some useful purpose, but if this is not done, it can at least be put into a boat and discharged into deep water a mile from the shore, where it would harm no one.

The other nuisances referred to are connected with imperfect cleansing, bad drainage, open putrid gutters and similar sources of impurity, not one of which would be permitted to exist under an efficient municipal administration. They are all so many indications of the absence of proper care for the public health, the results of which are visible in the mortality statistics and in diseases prevailing among the poorer classes of the population.

The Civil Hospital is on an eminence outside the town in front of the prison. It is a large building originally intended as a residence and converted into a hospital. The rooms are spacious, lofty, and well lighted, and afford good accommodation for the sick. The building is wanting in many details and conveniences, but it is nevertheless by far the best civil hospital in the Ionian islands, and could be made sufficient for its purpose so far as the construction would admit, at no great outlay.

The brief sketch given above shows that the sanitary defects existing in Corfu are the same as those found in other imperfectly civilized communities. They are the same in character though in some respects worse in degree than are found to exist in the Levant towns generally. All of them are removable, and would very soon disappear under an improved system of agriculture, and under a better municipal government.

What the people require is a proper sanitary administration, embodying powers similar to those in the English Public Health Act. As already stated, a drainage survey should be made of the town by a competent sanitary engineer, and a complete system of sewerage, drainage, and water supply on the most approved modern principles should be carried out. Every house should be drained and supplied with water and with proper civilized domestic conveniences. The villages should be similarly improved, unwholesome open ditches should be replaced by sewers and drains, and proper roads made.

Better paving and channelling is required for the public streets, and all courts should be flagged, channelled, and drained. Public cleansing should be better organized and made more effectual, and filth should be removed out of the town at least once a day. The same system of cleansing should be extended over the neighbouring villages and open spaces, and all nuisance prevented.

Better water should also be obtained for the town. Under a wise municipal administration the town would be opened up and bad close streets and courts removed. More house accommodation and of a better character would be provided; existing houses of the poorer classes would be cleansed, lime-washed, and made wholesome. A market similar to the new one at Valetta would be provided, to replace the present very inferior market.

Agricultural drainage and the drainage of marshes and marshy ground would form no unimportant part of municipal duty, either in the way of direct execution or of encouragement.

As Corfu is a garrison town, everything that can in any way bear on the health of the troops should be under the inspection of a garrison sanitary officer in terms of the new medical regulations.

If these things were done Corfu would be a very different place from what it is. But it depends on the people themselves to wipe off the stigma attaching to their beautiful island of being unhealthy as well as beautiful, and of being at the same time one of the spots of the East most favoured by nature and most neglected by man.

II.—SANITARY STATE OF THE GARRISON.

1.—Sickness and Mortality among the Troops.

The statistical reports on sickness and mortality in the army give the death rate among troops serving in Corfu and Vido for two separate periods.

1st. For 20 years intervening between 1817 and 1836, during which the mortality varied in different years from 12 to 35 per 1,000 per annum, the average for the whole period being 20 per 1,000 per annum. The average strength of the garrison during the period was 2,219. Of the total mortality 9 per 1,000 was due to fevers, 4·8 per 1,000 to pulmonary diseases, and 3 per 1,000 to diseases of the bowels. These three classes occasioned a mortality of 16·8 per 1,000, that is, they were the cause of four out of every five deaths.

The total mortality from fever amounted to 395 deaths, of which 29 were caused by intermittent, 251 by remittent, 109 by continued, and 6 by typhus fevers. Remittent and intermittent occasioned 7 out of every 10 deaths from fever.

The most important chest disease was phthisis, from which there were 129 deaths; to these may be added seven deaths from the cognate disease hæmoptysis, and seven from chronic catarrh, making the consumption mortality 143, out of a total mortality of 212 from lung diseases, or two out of every three deaths. The next most important chest disease was pneumonia, which was the cause of 57 deaths.

There were 136 deaths from bowel diseases, of which 102 were due to dysentery.

During these 20 years the diseases causing the greatest loss to the garrison were remittent fever, continued fever, consumption, and dysentery. There arose from these four diseases 591 deaths, out of a total mortality of 891, or 66 per cent. of the total deaths.

2. The second period given in the statistical reports is the 10 years from 1837 to 1846. The average strength of the garrison during this period was 1,696. The annual deaths varied from 10·1 to 23·5 per 1,000, the average for the 10 years being 15·8 per 1,000.

Of this mortality 4·5 arose from fevers, 6·1 from chest affections, and 1·5 from bowel diseases.

As compared with the first 20 years there had been a large reduction in the mortality, especially in that from fevers, which had fallen to one-half; but the admissions showed the same types of fever as during the preceding period.

Intermittent gave 28·9 admissions per 1,000 strength, remittent 12·2, and continued fever the very high proportion of 161·9 per 1,000 strength.

During these 10 years it is worthy of remark that while the strength of the garrison had been reduced, the barrack accommodation had been extended, and overcrowding materially diminished.

A return, Appendix 6, has been made up for us by the medical officer in charge, showing the diseases and mortality for the years from 1850 to 1860. The mortality apparently fell to 12·6 per 1,000 during this period, but as it includes the time of the Russian war, there may be disturbing influences to render it not a fair account of the case. The most important point shown in the return is the proportionate mortality from different diseases. It will be seen that during the 10 years in question fevers occasioned 30 per cent. of the deaths, and that 76 per cent. of the fever deaths were due to typhoid and continued fevers. Pulmonary diseases occasioned very nearly the same amount of mortality as fevers, and more than half of this mortality was due to consumption.

For the year 1859, the first year included in the annual report of the Army Medical Department, the facts are given more in detail. This report gives the strength of the garrison at 2,663, and the mortality at 15·37 per 1,000 strength, higher than the average of the 10 years in Table 6. The fever deaths had risen to 9·01 per 1,000, which was the average of the first 20 years. There were very few admissions, and not a single death from intermittent and remittent; the whole fever mortality arose from continued and typhoid fevers, of which 423 cases were received into hospital. Attention was called to this increase of fever by Deputy Inspector-General Beatson in his report for 1859, in which he points out the great danger to the health of the troops from the unwholesome state of the neighbourhood of certain barracks.

The year 1860 was a more healthy year. It appears from a return prepared for us by Deputy Inspector-General Innes, that there were 19 deaths during the year, of which eight were from chest diseases, including two from consumption, two deaths from remittent, and three from continued fevers.

On arriving at Corfu at the end of October 1861, it was stated to us that there had been a considerable increase of the admissions from fever since the beginning of the year, and to show this and the nature of the diseases, Dr. Innes was kind enough to prepare returns, Appendix 7 and 8, including the Corfu barracks separately, and also those of the other islands.

One return, Appendix 8, gives the following results for 10 months ending October 31, 1861 :—

Barracks.	Average Strength.	Total Fever Cases.	
		Admitted.	Died.
Venetian - -	862	135	9
Bomb-proof - -	728	132	5
Lower Fort Neuf -	336	100	4
Upper ,, -	211	33	2
Tents, ,, -	66	53	2
Huts, ,, -	54	24	—
Fort Abraham - -	146	46	—
Vido barracks - -	374	17	1
Tents and huts, Vido -	140	10	2
Lazzaretto - -	4	1	1
Total - -	2,921	551	26

According to this table, the average strength at Corfu and Vido for the period was 2,921, out of which there had been 26 fever deaths.

The nature of the fever cases for the first nine months of the year is given in Appendix, No. 7.

From which it appears that out of 517 fever cases 40 were intermittent, 53 remittent, 9 typhoid, 1 typhus, and no less than 414 of the continued type.

The total mortality for the same nine months was 32, of which 3 deaths were from remittent, 8 from typhoid, and 11 from continued fevers: affording a fever mortality of 22, or 66 per cent. of the total deaths.

The same table shows that during the same periods of time the admissions per 1,000 strength from fevers alone were 263 in Fort Neuf as compared with 143 in the Citadel, and the fever mortality was in the annual ratio of 11·5 per 1,000 in Fort Neuf, and a little more than 9·4 in the Citadel. A more remarkable circumstance is presented by the difference in the types of fever. It appears that attacks of intermittent and remittent were upwards of eight-fold more numerous in proportion to strength among the troops in the Citadel than in Fort Neuf, while fevers of the continued and typhoid type were 2½ times more numerous in Fort Neuf than in the Citadel.

These facts regarding the mortality and the types of fever in Fort Neuf and the Citadel are important when compared with the other facts as to the unfavourable sanitary condition of the vicinity of Fort Neuf already alluded to.

A return for the barracks in Vido is given in Table 8, but the troops there are chiefly detachments for rifle practice, and few remain for any length of time on the island. In former years the general opinion of medical officers was that most of the fever cases in Corfu were contracted in Vido, although this was never distinctly shown.

The only body of men whose residence in the island has been sufficiently long to bring them under its local influence as to health are the military prisoners, and with the view of obtaining some estimate of the healthiness of the island, we called for a return of admissions to hospital among prisoners for a period of 12 years (Appendix 9), which certainly does not prove the island to be specially unhealthy.

The return shows that out of a daily average strength of 33 prisoners there were in 12 years 242 admissions, being in the ratio of 611 per 1,000 per annum, while the admissions from fever were only 18 per cent. of the total admissions.

This greater healthiness may be due to the fact that although the prison cells are not all that could be desired, they are better ventilated and much less overcrowded than the barracks at Vido, and altogether the accommodation is better.

The barracks if occupied for any length of time by troops, especially if crowded, would be very likely indeed to yield a considerable amount of fever, for reasons stated in the sequel.

2.—Sanitary Condition of Barracks.

The whole of the evidence before us shows that fever is the most important element in the health of the garrison at Corfu, and after fevers chest affections. The basis of the more severe forms of fever is malaria, partly the result of the backward state of agriculture and of drainage, and partly the result of the abominable condition of the localities among which certain barracks are placed, but also, as we shall presently show, of errors in the position and construction of barracks, aggravated by great overcrowding, want of ventilation, defects in drainage, &c.

3.—Sites of Barracks.

The following is a list of the barracks and hospitals in Corfu and Vido,—

Citadel.

Venetian barrack { A. barrack, royal artillery.
B. barrack, infantry.
Bomb-proof barracks.
Garrison Hospital.

Fort Neuf.

Upper Fort Neuf barracks.
Lower Fort Neuf barracks.

Fort Abraham.

Old barracks.

Vido.

Fort George.
Hospital room.
Lunette barracks.
Maitland Tower.

With the exception of Upper Fort Neuf barrack, the old barrack room in Fort Abraham, and Maitland Tower, accommodating in all about 244 men, none of the barracks in this list occupy good healthy positions; all except the three small barracks we have here mentioned have their ventilation more or less interfered with by high scarped rocks, or by high surrounding walls. Defence more than health has dictated their position.

The Citadel, within which the most important barracks and the garrison hospital are situated, occupies the summit and sides of a narrow rocky peninsula, projecting into the bay to the east of the town of Corfu, from which it is separated by the esplanade.

Its extreme length is less than half a mile, and its breadth is about 250 yards. The surface is merely that of an irregular rock with two summits, the loftiest of which rises 231 feet above the sea level. This is separated from a lower summit by a narrow neck of ground 115 feet above the sea, affording a site for the hospital. Surfaces on which to build barracks or other buildings, as well as for esplanades, have been chiefly formed by levelling and cutting away the rock, and nearly every available spot is occupied in one of these ways.

The Venetian barrack is on a terrace facing the north, and overlooking the sea at an elevation of about 40 feet above it. But immediately behind it are the "long rooms" as they are called, built literally against the scarped rock, which rises far above the barracks and cuts off all external movement of the air on the south side. The natural fall for the drainage of the rock is directly towards the barracks, which are built across the line of the fall. This is always unfavourable to health in districts subject to malaria. The sea immediately below the barrack is shallow, stagnated by the small yacht harbour, the "mandracchio," and as a large part of the Citadel drainage has its outlet into the shallow water close under the barracks, there is much nuisance experienced from its decomposition in certain states of the wind.

The Hospital occupies a good site, except that the south winds have been cut off from the wards by a building erected between the hospital and the sea. Before this was done the wards had the benefit of winds both from north and south.

The Bomb-proof Barracks face east and west. On the east side the rock fronts them at a short distance, and on the west side they are enclosed by the defences, between which and the barracks there is a range of workshops, &c. The site is about 40 feet above the sea level, but these barracks do not receive the full benefit of the sea breezes.

Upper Fort Neuf Barrack crowns a rocky eminence 182 feet above the sea. Its position is good, and ought to be comparatively healthy, except that it is exposed to the winds blowing over the filthy town below it.

Lower Fort Neuf Barrack is very unfavourably placed; for although built on a terrace of rock 26 feet above the sea, and overlooking it, the back wall of the building is within a few feet only of the lofty scarped rock, rising 150 feet above its foundations. This great wall completely excludes ventilation on that side, and, as in the case of the Venetian barrack, the line of building is constructed across the natural outfall for the drainage. As already mentioned, the great defect in its position is the state of the town drainage outlets and the condition of the foreshore. Altogether, this barrack occupies the most unhealthy site within the garrison, and sends numerous fever cases to hospital.

While we were at Corfu considerable uneasiness prevailed on account of the amount of fever which had shown itself in this barrack during the preceding part of the year, and it was mainly attributed to the circumstances alluded to.

Fort Abraham occupies the summit of a hill rather lower than Fort Neuf, about a quarter of a mile to the south-west. The position is healthy as to elevation, but is rather more exposed to malaria from undrained land to westward. The accommodation is limited to one room at present, but there is space for extension, without resorting to a most objectionable scheme which has been proposed for barracking the troops in long casemates formed by arching over some old ditches inside the fort.

Vido Barracks are all placed on the highest and healthiest parts of the island, but from the way in which Fort George barracks have been included in the defences, most of the natural sanitary advantages of the site have been sacrificed. The barracks are close to the works and sunk below the level of the ground outside. The Lunette barracks are somewhat better placed. But, except at Maitland tower, free external ventilation is to a great extent cut off by the method of construction adopted. Vido barracks would in all probability furnish a considerable per-centage of sick if fully occupied for any length of time at their present allotment of space per man.

4.—General Construction of Barracks.

None of the barracks are arranged on a really healthy plan. Their construction has apparently been determined either by the size and position of the ground, or simply by the relation which the men's accommodation was intended to bear to the defences. There is no evidence that the question of health has been considered. While stating this fact we at the same time admit that it is not an easy thing to conjoin all the required conditions on sites so circumscribed and otherwise so unfavourable as those of the Corfu barracks, but the best has certainly not been made of these sites.

The Old Barracks in the Citadel built during the Venetian occupation are not suited to their position. Fig. 23 is a plan of the old Venetian Barrack, which consists of double, or back to back barrack rooms, no less than 43 feet broad between the opposite windows. On a high and exposed position in a cool climate this structure would have been less objectionable, but situated as the barracks happen to be at a mean distance of about 50 feet from the lofty rock behind them, and having a long range of other barrack rooms between them and the rock, there cannot be that free perflation of air which is so necessary for health in such a climate. The rooms behind, called the "long rooms," although close up to the rock, are better rooms than those in the large barrack, because they are single, and consequently much narrower, and have windows or openings along two opposite sides. There are, moreover, only two rows of beds between the opposite windows. These "long rooms" afford the only instance of this construction in the garrison, and although the worst placed they are the most airy barrack rooms, showing how much construction can compensate for unfavourable site.

Every room in the Venetian barrack felt close when we were there, although the windows were open and the weather was comparatively cool. Hardly any of the rooms have sufficient window space. The rooms facing the rock were all dull and uncomfortable.

Except the "long rooms," and the old barrack of Fort Abraham, all the other barrack rooms have the windows at opposite ends, with the beds ranged along the dead walls.

Lower Fort Neuf Barracks, a plan of which is shown in Fig. 25, consist of three floors over a basement, and, as in the old Venetian barrack, the rooms are reached by outside corridors and staircases on the side next the scarped rock, on which indeed the stairs are partly supported.

The nature of the position which this barrack occupies in regard to the rock, and its probable influence on the ventilation of the rooms may be judged of by the extent of the basement occupied by solid rock, (shown in the figure,) which has been cut away above to find space for the rooms and stairs.

Each barrack room has two windows at the end facing to the sea, and two smaller windows with a door on the side towards the rock. The distance between these opposite windows is 48 feet, which is also the length of the room. The beds, 22 and 24 in number, are arranged half on either side the room, so that there are 11 or 12 beds between the opposite windows. The difficulty of thorough ventilation in this case, is of a similar kind to what exists in the old Venetian barrack.

Upper Fort Neuf Barrack is casemated, and has the doors, windows, and loopholes at opposite ends of arches from 32 to 33 feet distant from each other, with two rows, of from 8 to 10 beds each, along the walls between them.

The New Bomb-proof Barracks in the Citadel are on a similar plan. They are casemates 48 feet long, with windows at opposite ends, and 26 beds ranged along the walls, 13 on each side. The rooms are on two floors over a sunk basement; all the rooms on each side the entrance communicate by arches in the division walls, so that their ventilation or rather their foul air is common throughout.

The Barracks in Vido, as shown in Figs. 26 and 27, are part of the works, and consist of short casemates communicating with each other by doors at the ends; the rooms are all on the ground floor except those in the tower at Fort George, which are in two floors. Altogether the rooms in the Lunette barracks are the best; they are 31 feet six inches long and have five beds along each opposite wall, with a door and two loopholes at one end, and three loopholes opposite. These five loopholes are the only means of light, and, except a shaft in the roof, of ventilation also, for ten men, when the door is shut.

Considered in relation to its probable influence on health, it cannot be said that the construction of barracks at Corfu and Vido is favourable. The rooms are too dark, natural ventilation is obstructed from the nature of the plan as well as by the position of the rooms. It would be much better to reserve some of the rooms, especially at Vido, solely for defensive purposes, for not one of the rooms will bear an approach to overcrowding for any length of time without danger to health.

The only barrack construction admissible in these climates, at least so far as concerns health, consists of separate buildings, of very simple plan, with windows on opposite sides, and perfectly free ventilation.

5.—Space per Man in Barrack Rooms.

There are only three barracks at the station in which the troops have anything like sufficient space for health. These are the two "long rooms" in the Citadel, and the old uncomfortable room in Fort Abraham. The three rooms hold 212 men out of 2,494, which represents the regulation accommodation of the permanent barracks. All the other rooms are overcrowded. There are 1,433 men with between 230 and 400 cubic feet each, and 288 men have less than 250 cubic feet each. Every man in this garrison except 408 has less than 50 square feet for himself and his bed. The details are given for each barrack in Table 10, Appendix, and the following is the general result for the garrison:—

Cubic Feet.									Superficial Feet.			
200 to 250.	250 to 300.	300 to 350.	350 to 400.	400 to 450.	450 to 500.	500 to 550.	550 to 600.	Above 600.	20 to 30.	30 to 40.	40 to 50.	50 to 60.
No. of Men. 288	No. of Men. 80	No. of Men. 140	No. of Men. 925	No. of Men. 361	No. of Men. 314	No. of Men. 80	No. of Men. 94	No. of Men. 212	No. of Men. 368	No. of Men. 1,294	No. of Men. 424	No. of Men. 408

This overcrowding, which is very great for such a climate, has attracted the serious attention of the military authorities, and the case has already been represented to the War Office, but there is great difficulty in knowing how to deal with it unless some of the troops be withdrawn. The ground available for barrack accommodation in the Citadel and Fort Neuf is very limited; and if it is considered necessary to keep a larger force than there can be healthy accommodation for, there is of course no help for the evil. It is our duty, nevertheless, to point out what amount of healthy accommodation there is, and how any deficiency may be met in the simplest and most economical way.

There is no regulation as to the extent of cubic space a man should have in such a climate as Corfu, and it is doubtful how far, during summer at least, 600 cubic feet, the amount per man allowed at home, would be sufficient for health, especially when the sites of these barracks and their defective external ventilation is taken into account.

We would propose to adopt the 600 feet as a winter standard, recommending at the same time that it be increased in summer by providing temporary accommodation on healthy ground for the men whenever any disposition to increase of fever manifests itself in barracks. Assuming this as the standard the following table shows the amount of barrack accommodation at 600 cubic feet per man in contrast with the present amount:—

Name of Barrack.		Present regulation Number of Men.	Number of Men at 600 Cubic Feet per Man.	Present Average Number of Superficial Feet per Man.
Venetian Barrack -	A	154	103	40
	B	826	598	42
Bomb-proof Barrack -		624	396	34
Lower Fort Neuf -		264	312	41
Upper Fort Neuf -		160	81	32
Fort Abraham - -		56	56	—
Fort St. George, Vido -		252	96	22
Lunette, Vido - -		130	91	44
Maitland Tower -		28	21	46
Total - -		2,494	1,654	—

This table shows the average deficiency of cubic space throughout the garrison to be one-third, and that there is proper barrack accommodation for no more than 1,654 men.

The present garrison is altogether too large for the accommodation and therefore either the garrison must be reduced to this number or barrack accommodation provided for 840 men. If this latter course be taken, hut barracks on the plan No. II. proposed for Cerigo, of plain brick or stone, properly ventilated and provided with a verandah, would be the most healthy buildings for the purpose. The floors should be raised two or three feet above the level of the ground, and free ventilation provided under the floor, to cut off ground malaria.

6.—VENTILATION.

The barracks are generally deficient in window space, and as already mentioned, the windows are mostly placed at the far ends of the rooms instead of down the sides. Many rooms in the works have a window only at one end and loopholes at the opposite end, and there are a number of rooms having no windows, only doors and loopholes. With such a construction there cannot be good natural ventilation. The long rooms in the Citadel are the only ones with windows properly placed. None of the rooms have any sufficient ventilation by other means. A few shafts have been put into the old Venetian barrack, but not on a good principle. In some cases in this barrack the shafts have been carried up from the lower rooms through the upper rooms, and openings have been made into the same shaft from the different floors through which it passes. This arrangement of course prevents the shaft from acting and it becomes merely a passage for foul air from the lower to the upper rooms. Shafts and inlets have been built into the works of the Lunette at Vido, but they are placed close together, and at the wrong end of the room, just over the door, where they are least required, and do little or no good.

In several of the casemated barracks the rooms communicate by doors through the piers, so that the foul air passes through all the rooms in common. This construction is contrary to a fundamental principle in barrack ventilation, namely, that each room should be separately ventilated. All these doors should be built up wherever there are separate entrances for the rooms, and where there are not separate entrances, such entrances should be made by outside terraces and verandahs, wherever practicable. There are no fire-places, and these important ventilating agents are not replaced by any others.

The general result of our inquiry is that the ventilation of all or very nearly all the barrack rooms is deficient.

In the reports on each barrack we have stated the improvement required to remedy this material defect, and we shall merely resume generally the principles of ventilation adapted for the garrison.

1st. Windows should be enlarged and additional windows put in wherever a dark corner can be lighted and aired by them.

2d. Wherever practicable the loop-holes should be enlarged and loopholed iron shutters provided for defence use in case of necessity.

3rd. Every barrack-room should have a foul air shaft or shafts, according to the size of the room, carried from the ceiling and placed as near as may be in the middle of the length of the room to above the roof, each room having an independent shaft, not communicating with the shaft of any other room; also one or more inlets for fresh air close to the ceiling at each end of the room. The shafts should be properly louvred above to prevent the rain beating in. The nature of these shafts has been already described and figured on Plan X. Muir's construction, fig. 19, will be found the best in practice, for upper rooms directly under the roof, as it takes advantage of external air currents in ventilating the room. To prevent down draughts being felt it would be desirable to terminate the lower end of the shaft within the room by a louvre, as shown in Plan X.

4th. Fire-places should be introduced and provided with ventilating fire-grates. (A model of such a grate for burning wood, Plan IV., has lately been sent out.)

5th. As already mentioned, all doors between rooms should be built up, and the rooms should be provided with separate entrances from the open air.

By keeping these principles in view, and adapting them to each room, most of the Corfu and Vido barrack rooms may be ventilated.

7.—Drainage.

The drainage of Corfu barracks is generally direct to the sea. Those within the citadel have eight outlets, partly on the north partly on the south side of the rock. The drains are mostly old Venetian drains, the construction and dimensions of which are unknown. Several of the outlets, especially those from the latrines, are not carried into deep enough water, and occasion nuisance.

The barracks in Fort Neuf are drained into the shallow water in front of the lower barrack; but great nuisance to these barracks proceeds from the town drainage already described. The barrack outlets require to be carried into deep water as well as those belonging to the town drains.

Fort Abraham is not drained; it has only a cess-pit. This should be abolished and a proper drain made.

Vido barracks are drained to the sea, but one of the outlets opens into a shallow bay at the landing place, and causes great nuisance in summer. This outlet requires to be carried into open water.

In every instance the fall is much more than sufficient to ensure ample drainage.

8.—Latrines.

All the latrines are drained, but they are either constructed imperfectly as water latrines, or they are merely washed out into a drain leading to the sea.

All of them, including the hospital latrine, are very offensive, and in most instances the effluvia from them pervade the atmosphere to some distance, even into barrack rooms and sick wards.

The drains immediately connected with the latrines appear to be defective in several instances, as nuisance is experienced in their neighbourhood.

These matters are all of primary importance in such a climate, and they cannot be neglected without exposing the troops to the risk of fevers.

The general principles to be kept in view in improving the drainage and latrines is to see that the drains are of proper construction and well laid. An ordinary earthenware pipe drain, well laid and closely joined, is quite sufficient for any purpose of barrack drainage in Corfu. All the outlets should be carried by well-secured iron pipes into deep water, and their mouths should terminate in a T head in order that the sea should not strike directly into the open end. All the drains should be ventilated by a pipe of adequate dimensions carried from the highest point of each drain above the roof of the highest building.

The latrines should be reconstructed with Macfarlane's or Jennings' apparatus, Plans XII. and XIII., amply supplied with water, and the latrine buildings should be better lighted and ventilated. All drain openings should be trapped.

These improvements will put an end to the present nuisance and the risk to health constantly accruing from it.

9.—Urinals.

The urinals are not of good construction, and are generally great nuisances. They should be of slate or earthenware as in Plans XIII. and XIV. Urinals should be provided in connexion with the barrack rooms. They should be placed in a closet off the barrack room, and separated from it by a ventilated lobby. The best form of urinal for a barrack room is the one recently introduced by Mr. Jennings, Plan XIV. On Plan XV. is shown an arrangement of night urinal suitable for hut barracks in situations where drainage and water cannot be obtained.

10.—Water Supply.

All the Corfu barracks are supplied with water from the town aqueduct. Any amount can be had, but in one or two cases, as at the hospital, the pipes are stated to be too small, and the pipes generally are liable to incrustration from the nature of the water. As already stated the quality is far from being good, and it would be highly advisable to supply the aqueduct from other sources, if such can be obtained. Rain water can also be collected from roofs. There is tankage for 500,000 gallons.

Water is generally laid on for use.

At Vido water is derived partly from wells, partly from rainfall on the stone surfaces of the works. All of these surfaces are swept regularly to keep them clean, and the tanks are provided with filters, which is a great improvement on the arrangements for collecting rain-water at Gibraltar and Malta.

The tank space at Vido can contain about 400,000 gallons. The quality of water is said to be pure and good, but the quantity is not sufficient without great care be exercised to prevent waste. All the roof water is not collected, and the supply would admit of considerable augmentation from this source. Additional wells might also be sunk at favourable points.

At Vido salt water is used for the latrines. It is thrown up by a pump worked by prisoners.

No water is supplied for any purpose at Vido except what is raised by pumps and carried by hand. It might be well to provide iron tanks at a sufficient level to supply water by gravitation to the ablution rooms and kitchens. These tanks should be filled during rain from the works, and at other times by force pumps. The whole of the roof water should be collected for use.

Water might also be obtained from wells.

11.—Ablution and Bath Accommodation.

The means of personal cleanliness are defective in all the Corfu barracks, and there are none at Vido. The Venetian barracks have two ablution rooms, situated under the long rooms in a very objectionable position on account of the damp arising from them. The Bomb-proof barracks have their ablution accommodation in the damp, dark, sunk basement under the men's rooms.

At Lower Fort Neuf barrack there is a small inconvenient ablution room, and as the men can only wash thoroughly by throwing water over themselves, there was a much larger consumption of water for washing than necessary, and the whole place was soaked with water when we saw it. There is an ablution shed in the upper barracks.

Properly speaking there is no bathing accommodation at any of the barracks. There are two very bad wooden baths at the Venetian barrack, but none anywhere else, and there are really no means of cleansing the whole body except by sea bathing, which, however excellent as a means of health, is an imperfect means of cleanliness, unless used with marine soap.

All these arrangements require to be changed. There is plenty of fresh water for baths, which should be provided in the proportion of one bath for every 100 men at least. One bath-house would do for the Citadel, and another for Fort Neuf. One would also be required for Fort Abraham.

There being little spare ground for proper ablution rooms at any of the barracks, as much as possible should be done by suitable fittings, to diminish damp from them in the neighbourhood of the men's rooms. Fixed basins with water laid on as in Plan XV. should be introduced instead of the present system of tilting over the basins and allowing the foul water to spread itself about on the benches and floors.

At Vido barracks the men either wash in their rooms or in the barrack yards, and all water has to be pumped up from tanks for use. A properly fitted ablution room, with drainage and water laid on and fixed basins, as in Plan XVII., is required for each barrack. Two baths would be a great advantage, provided sufficient fresh water could be obtained, but this is doubtful. It would be easy to provide two salt water baths, for salt water is already pumped up for other purposes, and if it were used with marine soap, the men could wash themselves thoroughly; at all events this is worthy of a trial.

12.—Cook-houses.

All the barracks, both at Corfu and Vido, have cook-houses. Some of them are deficient in ventilation, and are very hot. None have ovens specially belonging to them, except one at Vido. There is an oven in a casemate in the Citadel, not used by the regimental cooks, but by a man who bakes the messes at a fixed charge. At Fort Neuf the men use a commissariat bakehouse. It would be much better to make the kitchens complete, and to provide them with the improved steel boilers and ovens, Plan XVIII., so constructed as to burn wood and economize fuel.

13.—Married Quarters.

Nothing could well have been worse than the provision for married soldiers and their families as we saw it. Families were lodged together in large rooms in the Venetian barrack, in common, much overcrowded and without regard to decency, or they occupied very inferior huts. The accommodation was so bad and so deficient that two inferior houses in Corfu were rented to increase it. Since our inspection a range of married quarters has been authorized within the Citadel, and this great deficiency will be in part supplied by excellent healthy accommodation. It is an obvious principle in this crowded garrison to admit of no encroachment on the men's rooms, but until all married people are properly lodged it is hardly possible to avoid placing them in barrack rooms.

14.—Women's Wash-houses.

There is one excellent women's wash-house in the Citadel, but it requires better drainage and proper fitting up. Another not used is attached to Lower Fort Neuf barracks.

There is none in Vido.

The accommodation should be extended and improved by providing fixed tubs, water laid on, boilers, and means of drying and ironing.

15.—Guard Rooms and Cells.

The following table gives the accommodation in the way of guard rooms and cells at Corfu. We have received no return of the number of men usually on guard, and we have therefore given the number each guard room ought to contain at 600 cubic feet per man:—

Barrack.	Number of Men Guard Room will contain, at 600 Cubic Feet per Man.	Cells.	
		Number.	Cubic Feet per Prisoner.
Artillery, Citadel -	12	1	536
Venetian „ -	7	None.	—
Bomb-proof „ -	4	4	661
Fort Neuf - -	7	4 { 3	832
		1	1,664
Fort Abraham Crimean wooden hut.	—	—	—

The guard rooms generally are too small for the men on guard, and they all require more ventilation by shafts and inlets. The local government guard rooms are very inferior, and certain of them, such as that near the custom house, hardly fit for occupation. This is a matter which requires to be rectified. The construction of guard room shown on Plan VI., is suitable for the purpose.

The cells are generally too small for the climate, and they all require improved ventilation.

The present establishment in the Citadel consists of a block of cells built close to the rock. Indeed the lock-up room has its back wall against the rock, which is very objectionable for health. There is no ablution room, and the men have to wash in the yard.

The privy at the back of the cells is over a cesspit; it is very bad and requires reconstruction with drainage and a water latrine.

We next proceed to describe the barracks more in detail.

III.—DETAILED REPORTS ON THE BARRACKS AND HOSPITAL.

Citadel Barracks.

There are two barracks within the Citadel:—

1. The old Venetian barrack, including the Artillery barrack and the "long rooms."
2. The Bomb-proof barracks.

1.—Old Venetian Barrack.

This is a large old building, consisting of a centre with two wings projecting from its northern face.

It is situated on the northern side of the Citadel rock, on a platform about 40 feet above the sea, from which the front is separated by a narrow esplanade.

The rock, as already stated, rises to a considerable elevation behind the building, and cuts off the ventilation on the south side. Close under the western extremity of the barrack there is a small harbour (the Mandracchio) enclosed by low stone walls and containing stagnant water. The sewer from the barrack privies enters the sea close to the south end of this harbour, but outside its wall. From both sources, viz., the stagnant water of the Mandracchio and the sewage, much nuisance at times arises.

The line of the barrack is almost due north and south. The northern end and wing are occupied as officers' quarters. The centre part is used as an infantry barrack, and the southern end and wing are occupied by the Royal artillery.

The "long rooms" are built on a ledge of rock immediately behind the Venetian barrack, at a somewhat higher elevation, and contract still more the limited space behind the main building.

The site is certainly not a favourable one, but in this, as in other similar cases, its choice has apparently been the result of necessity. The only improvement of which the site admits is carrying the privy sewage out a sufficient distance to seaward, to diffuse it in as large a body of water as possible, and to open a few arches in the walls of the Mandracchio to admit of a more free circulation of water through it.

The barracks are four floors in height. The western face of the buildings, next the rock, is protected by verandahs, affording at the same time access to the rooms. Verandahs are also carried along the south face of the projection containing officers' quarters. There are no verandahs on the east side, and the sun beats into the rooms with great force during the forenoon.

The ground floors are used chiefly for stores, but two or three rooms are occupied by soldiers and as married quarters, affording accommodation of an inferior description.

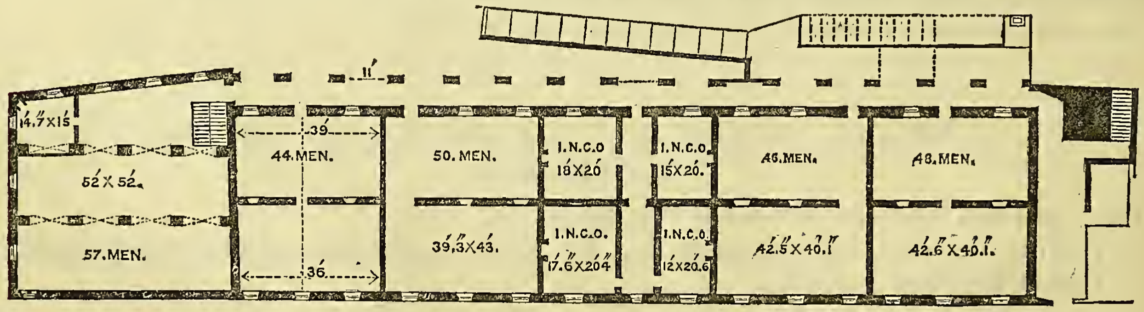
The three upper floors are divided into barrack rooms in the following manner:—

The centre building has party walls carried across it from back to front, dividing it into five separate barrack houses. The centre house of the five has a passage right across it from back to front, on each side of which there are two non-commissioned officers' rooms. The other four houses are divided by a party wall, running the lengthway of the building, into two rooms each, one facing the east, the other facing the west. There are doors and arches through this wall to allow of the rooms being entered from one another. The distance between the front and back windows, through the arches, is about 43 feet, which is double what it ought to be for really good ventilation, and there are four rows of beds between the opposite windows. Each of these double rooms has three windows to the east, overlooking the sea, and two windows and a door to the west opening on the verandahs, and looking on the lofty rock and on the "long rooms" behind.

The artillery barrack rooms are partly entered from the ground level and partly from the south end of the verandahs. The upper rooms in this part of the barrack are 52 feet square, and have two rows of piers down the middle. They have three windows facing the rock, two windows looking to the south and one window to the east.

The deep north-east angle of these rooms is 50 feet from the nearest window, and of course it is very gloomy and badly ventilated. If it were practicable to open a large oblique window in this angle it would improve the light and ventilation of these rooms to a very considerable degree. The general arrangement of these rooms is shown in the following Fig. 23:—

Figure 23.—Ground Plan of the Venetian Barrack, Citadel, Corfu.



The "long rooms" are in a long narrow building close upon the rock, which rises vertically within a few feet of their back wall. The building is in two floors; the lower floor is used for stores, ablution room, &c., and the men are accommodated only on the upper floor. These rooms have small windows on opposite sides; they are of a good height, and afford, on the whole, the best accommodation in the barrack.

Accommodation.—The artillery part of the barrack (known as A. barrack) contains four men's rooms and three rooms for non-commissioned officers, affording regulation accommodation for 157 non-commissioned officers and men, the details of which are given in the following table:—

A. Barrack.

Rooms.	Regulation Number of Men per Room.	Dimensions of Rooms.			Cubic Feet per Man.	Superficial Feet per Man.	Windows.		
		Length.	Breadth.	Height.			No.	Height.	Width.
Men.		ft. in.	ft. in.	ft. in.				ft.	ft.
No. 1 - - -	26	39 6	26 0	10 6	414	38	2	4	6
2 - - -	36	58 0	26 0	10 6	439	41	5	4	6
3 - - -	46	71 0	26 0	10 0	401	40	7	4	6
4 - - -	46	71 0	26 0	10 0	401	40	7	4	6
Non-commissioned Officers.									
No. 1 - - -	1	13 0	15 3	10 6	2,087	198	2	4	6
2 - - -	1	16 0	17 6	10 0	2,800	280	2		
3 - - -	1	16 0	18 0	10 0	2,880	288	2		
Guard Room - -	—	44 0	23 0	7 6	—	—	3	3 6	4 3
Cell - - -	1	11 0	6 6	7 6	536	71	—	—	—

Overcrowding.—The men's rooms in the artillery barrack are overcrowded to the extent of at least one-third, simply as regards cubic space. But the actual overcrowding is greater, because from the square form of the rooms there are six rows of beds between the front windows and the opposite dead wall. Assuming 600 cubic feet per man as our standard (although this standard is applicable only to barracks at home) the proper numbers in each room would be as follows:—No. 1 room, 17 men; No. 2, 26 men; Nos. 3 and 4 rooms, 30 men each. This would give 103, instead of 154 men, for the artillery barrack, which is the utmost number it ought to contain.

The accommodation in B. barrack (infantry), including the "long rooms," consists of 18 men's rooms and 17 rooms for non-commissioned officers, holding 843 non-commissioned officers and men. The rooms for non-commissioned officers give from 2,736 to about 4,000 cubic feet for each man. The following table gives the statistics of the men's accommodation:—

B. Barrack.

Rooms.	Regulation Number of Men per Room.	Dimensions of Rooms.			Cubic Feet per Man.	Superficial Feet per Man.	Number of Men at 600 Cubic Feet each.	Windows.		
		Length.	Breadth.	Height.				No.	Height.	Width.
Nos.		ft. in.	ft. in.	ft. in.					ft. in.	ft. in.
1	36	39 6	20 0	10 6	230	22	13	4	5 9	4 0
5	15	29 6	20 0	10 6	413	39	10	2		
14	42	40 6	40 0	10 6	405	28	28	3		
15	39	40 0	42 6	10 0	436	43	28	5		
20	41	40 0	42 6	10 0	414	41	28	5		
21	42	39 3	43 0	10 0	400	40	28	5		
22	47	39 3	43 0	10 0	355	35	28	5		
26	46	52 0	52 0	10 0	597	59	45	8		
27	46	40 0	44 0	9 9	373	38	28	5		
32	44	40 6	44 0	9 9	395	40	28	5		
33	42	39 3	44 3	9 9	418	43	29	5		
34	47	37 0	44 6	9 9	329	35	26	5		
38	48	52 0	52 0	10 0	563	56	45	8		
43	46	40 0	44 0	9 0	344	38	26	5		
44	42	40 6	44 0	9 0	382	42	26	5		
45	47	39 3	44 3	9 0	332	37	26	5		
47	77	145 3	27 0	17 0	873	57	77	16	4 2	5 6
48	79	148 0	28 0	17 0	891	52	79	16		
Total 18	826	—	—	—	—	—	598	—	—	—
Guard Room -	—	20 0	15 6	10 0	—	—	—	—	—	—

Overcrowding.—The overcrowding in this barrack is excessive. In several of the rooms it is as great as in some of the worst barracks at home. We have added a column to the table giving the accommodation at as near as may be 600 cubic feet per man for each room, from which it will be seen that the rooms will accommodate 598 instead of 826 men, their present number.

Ventilation.—The ventilation in all the rooms is deficient. It is provided for chiefly by doors and windows, but the window space is much too small, and the rooms too wide in proportion to their height, to admit of a sufficient renewal of air by these means at night. Some of the rooms have ventilating openings in the walls; others have had shafts recently carried up from their ceilings. In one or two instances these shafts merely carry the foul air from the rooms below to the rooms above. The "long rooms," from their greater height, and from having windows on opposite sides, are better ventilated, but not sufficiently so.

This old barrack, as a whole, is of so bad a construction, and its position is so unfavourable for thorough ventilation, that it would be difficult to lay down a detailed plan at once and to predict that it would be successful. It will be more satisfactory to adopt certain principles of ventilation applicable to these buildings, and to apply them until the ventilation is satisfactory. The following are the principles we propose for adoption:—

1. There should be more window space wherever it can be obtained. In the large artillery rooms there should be large windows in the angle of junction between the wing and the main building, as already mentioned. In all the rooms the windows should be carried up close to the ceilings, and the added part should be independent of the present window, and should open separately.

2. Each room (according to its size) should have one or two ventilating shafts carried up in the line of the central arched wall, from the ceiling above the roof. The shafts should ventilate only the room to which they belong. All openings in existing shafts, by which the foul air of any one room can communicate with the atmosphere of any other room, should be closed. Every room in the building must have its separate and independent means of ventilation.

3. Each room should have louvred inlets for fresh air in the outer walls between the windows close to the ceiling.

These outlet shafts and inlets should be constructed on the principles already laid down and figured in Plan X.

After the works are executed the ventilation should be examined at night, and the inlets increased in number or enlarged until the requisite degree of purity of the air is arrived at. But it should be kept in mind that hardly any means of ventilation, except sleeping with all the windows open, will ensure even a tolerable state of the atmosphere with the present great overcrowding. It is absolutely necessary for health that the overcrowing should be put a stop to.

There are some double rooms on the lower floor which have no through draught. This should be obtained by openings in the division walls:— A doubtful expedient, but it may be of use in the special cases alluded to, provided the full amount of cubic space per man be given.

The best ventilation for the "long rooms" will be obtained by louvres along the ridge, and by inlets for fresh air along the eaves on both sides.

Ablution and Bathing Accommodation.—There are two ablution rooms belonging to the Venetian barracks, situated under the "long rooms," with only a boarded floor intervening between their wet surfaces and the place where the men sleep.

They have water laid on, and flagged floors with a grating in the middle, down which the waste water escapes after having been thrown over the floor. The situation of these washing places is objectionable as regards health. If there is any available open space in which they can be reconstructed this should be done; but if not, it would be better to limit the exposed wet surface as much as possible, by having fixed basins similar to those in Plan XV. and foot-pans, with water constantly laid on. Each room has two wooden fresh water baths of a very inferior kind, which should be removed and a proper provision of slate or metal baths should be made to afford the requisite means of cleanliness. One such bath for every 100 men, with water laid on, is required, and one bath-house would be sufficient for the Citadel.

Cook-houses.—There are two cook-houses, one belonging to the B. barrack, the other to the artillery. The former is a detached building, with abundant roof ventilation. It has boilers of the old pattern, but no oven. The artillery cook-house is in the ground floor of the Venetian barrack, and has boilers, but no oven. It is defectively ventilated. The only means of varying the cooking is by an oven attached to the cook-house of the Bomb-proof barracks, above 1,000 feet distant from the centre of the Venetian barrack, and on the opposite side of the Citadel.

It would be desirable to discontinue the present artillery cook-house under the barrack and to adapt the detached cook-house for all the men in A. and B. barrack, by fitting it up with a Benham's improved cooking apparatus for 800 men in two separate divisions. The cook-house should also be provided with a drained sink, with water laid on, a receptacle for fuel, and other conveniences.

Women's Wash-house.—An excellent wash-house has been recently erected at the south end of the barracks. It is provided with stone benches for holding tubs, and has moveable boilers, but there are no proper fittings similar to those now being introduced at home stations. There is sufficient roof ventilation, but the drainage is imperfect, and complaint is made that the women have often to stand in water while washing. This could easily be remedied if proper fittings were put up. A room for ironing linen is also required.

Water Supply.—Water for the Citadel barracks is obtained by pipes from the aqueduct belonging to the Ionian Government. There is a large tank capacity within the Citadel, and the supply is said to be unlimited. In some respects the distribution appears to be defective. Water should be laid on over the whole Citadel, so as to be always obtainable for lavatories, baths, cook-houses, wash-houses, latrines, drinking fountains, and other purposes.

Drainage, Latrines, Urinals, &c.—The fall for drainage is ample from all parts of these barracks. The drains were mostly constructed during the Venetian occupation, and very little is known about them. They are said to be sufficient for every purpose, There are four outlets direct to the sea on this side of the Citadel; but they should be carried into deep water to prevent the nuisance now arising from them.

The *Latrines* are close to the defences, opposite the centre of the barracks, and a few yards distant. They are defective in plan, and very offensive. They require entire re-construction on Macfarlane's or Jennings' principle, and they should be properly supplied with water. The outlet of these privies is too near the shore. It should be carried out by an iron pipe into water sufficiently deep to prevent nuisance.

The latrines should have divisions of seats and half doors, and the buildings should be freely lighted and ventilated.

The urinals should be reconstructed in the manner shown in Plans XIII. and XIV. and supplied with water for cleansing.

There is an ashpit beside the privy, which ought to be removed, and the barrack refuse collected in iron boxes and taken away daily.

Canteen.—This place was not in very good condition when we saw it. The ventilation and lighting are insufficient, and the rooms were not clean. It requires improvement in these respects.

Married Soldiers' Quarters. — There were none, properly speaking, except a few inferior wooden huts, affording very deficient accommodation. Men's accommodation had consequently been misappropriated in the already overcrowded barracks. One room for 42 men had been cleared of its occupants to make way for eight married soldiers, who could not be otherwise accommodated.

Between 40 and 50 married quarters are required, and one building, already mentioned, has been sanctioned since our return, and is in course of construction at the south end of the Venetian barrack.

The accommodation which existed at the time we were in Corfu was of a very bad kind, and quite unfit for decent occupation.

The sanitary improvements required for the Venetian barracks may be summed up as follows:—

More window space, improved ventilation, reduction of overcrowding, improved ablution and bath accommodation, improvements (including roasting ovens) for cook-houses, fittings for women's wash-house, improved latrines, urinals, and drainage.

2.—Bomb-proof Barracks.

These casemated barracks were completed and first occupied in 1847. They are situated across the entrance to the citadel, the gateway of which passes through the centre of the line. The buildings are in three floors, one of which, sunk below the surface level, is used as stores, and contains in addition the ablution room and women's wash-house of the barrack; the other two floors are occupied as barrack rooms. The whole block is about 430 feet long. It is isolated from other structures, but the external ventilation is not very good, because on the south side the Citadel rock and buildings of various kinds rise at no great distance, far above the top of the barracks, and on the north side a range of engineers' workshops, longer than the barracks, as well as the defensive works, run parallel with the range at about 50 feet distance, and interfere with the free circulation of air on that front.

The casemates are arranged side by side in two floors; they have windows at the opposite ends, and the distance in the length of the arch between the windows is 48 feet. So far as their general plan is concerned, they are among the best examples of casemated barracks we have seen; and with a few improvements in the details, they would form as good casemated barracks as could be constructed on the site.

The rooms are side by side, with the piers intervening. There are two entrances, one on either side the gate, and all the rooms communicate by doorways in the piers, which afford the only means of access to the rooms on each floor. The result of this arrangement is, that all the rooms in a suite have a common circulation of foul air through them. This is a defect in detail admitting of easy removal; and in doing so another defect can be remedied. The one we allude to is, the want of verandahs along the south front of the barrack, which is exposed, in a not very airy position, to the powerful summer sun during the whole day. If a verandah, supported on pillars, were carried along the south face to shade the upper floor of rooms, and a terrace for access to those upper rooms, answering as a verandah for the lower rooms, were constructed, and if means of access to the lower rooms were provided, by platforms carried across the sunk area, two great improvements would be obtained at the same time. 1st. All the doors between the barrack rooms could be built up, and so every room would have its own separate ventilation; and, 2nd, the south face of the building would be sheltered from the sun.

It would, of course, be necessary to convert one of the windows in the south front of each casemate into a door.

The accommodation afforded by this barrack is contained in 34 rooms, having regulation space for 634 non-commissioned officers and men at from 371 to 400 cubic feet and 34 superficial feet per man. The following Table gives the details:—

Number of Rooms.	Regulation Number of Men per Room.	Dimensions of Rooms.			Cubic Feet per Man.	Superficial Feet per Man.	Windows per Room.		
		Length.	Breadth.	Height.			No.	Height.	Width.
		ft. in.	ft. in.	ft. in.				ft.	ft.
Nos. 1 to 12, twelve rooms - -	26	48 0	18 6	10 10	400	34	3	8	4
Nos. 13 to 24, twelve rooms - -	26	48 0	18 6	10 0	371	34	3	8	4
Non-commissioned Officers, Ten Rooms.									
Nos. 1 and 2 - -	1	15 0	21 0	10 0	3,150	315	1	—	—
3 and 4 - -	1	10 0	21 0	10 0	2,100	210	1	—	—
5 and 6 - -	1	17 0	21 0	10 0	3,570	357	1	—	—
7 and 8 - -	1	12 3	21 0	10 0	2,572	257	1	—	—
9 and 10 - -	1	12 3	21 0	10 10	3,044	304	1	—	—
Guard Room, Nos. 1 and 2	4	12 6	18 6	10 0	578	58	2	—	—
4 Cells - - -	1	11 6	5 9	10 0	661	66	—	—	—

Overcrowding.—All the men's rooms in this table are overcrowded. The first 12 rooms (Nos. 1 to 12) should contain no more than 17 men per room. The last 12 rooms (Nos. 13 to 24) should contain 16 men per room, giving the nearest possible approximation to 600 cubic feet per man. The whole barrack, at this rate, has accommodation for 396 men, instead of 624, the present number of rank and file.

Ventilation.—The rooms are ventilated by means of the windows, when open, a small opening at the ceiling, and another near the floor, communicating with the outer air, and covered with wire gauze. Each room requires an outlet shaft carried up as near the middle of its length as possible above the roof, as in Plans X. and XI. figs. 1 and 2. There should also be an inlet of the requisite area, for fresh air at each end, close to the ceiling. These means would be sufficient to keep the air pure, if the doors between the rooms were built up, separate doors opened for each room, and the number of men reduced to the extent already stated. There should be fire-places in all the rooms, with improved ventilating fire-grates of the pattern already described, Plan IV. This would be an excellent barrack of its kind were these improvements in detail carried out.

Ablution and Bath Accommodation.—The ablution room is in the basement story of the barracks, in a dark and damp casemate. There is a stone ablution table, with water laid on, but no gratings for the men to stand on. The only means for removing the foul water is by a grating in the middle of the floor. There are no baths.

The place is not very suitable for men to wash in after leaving their beds. If space could be found for a proper ablution room above ground it would be a great improvement. As already stated, a general bath room for the whole Citadel would be sufficient.

Cook-house.—The cook-house is situated in a casemate at a short distance from the west end of the barrack. It has boilers of the ordinary pattern. There is a bakehouse in another casemate alongside it, let out to a man who bakes the soldiers' dinners at 2*d.* for a large dish and 1*d.* for a small one.

Instead of this arrangement each cook-house should have improved steel boilers and oven, as in Plan XVIII., and the cooking should be superintended by the regimental cook.

The yard in front of the cook-house is badly paved, and was wet. It should be flagged or paved with close-fitting square setts, and carefully channelled for drainage.

A similar defect exists in other paved places about this barrack.

Latrines.—These are in a long casemate on the western rampart. They have a trough, with ball valve, and are discharged into the sea. Macfarlane's or Jennings' latrines should be substituted for the present very offensive arrangement. The casemate itself is very dark, and is imperfectly ventilated.

Reading Room.—This is a large room, properly the court-martial room, but used as a reading room. It is very deficient in ventilation, and requires to be better lighted at night.

Schoolroom.—The garrison schoolroom is in a two-story building, opposite one end of the Bomb-proof barracks. There are stores on the ground floor, and the schoolroom above. It has windows all round, but no ventilation.

This room is used for amusements after school hours, but the accommodation it affords is inadequate. An additional story should be put on it, if practicable. The whole should be thoroughly ventilated, and accommodation provided for supplying tea, coffee, &c., for the men. It would then make very good garrison recreation and reading rooms.

Gymnasium.—The Citadel of Corfu is the only place where we have found a gymnasium in operation. It is a large substantial wooden building, constructed out of the proceeds of the canteen fund before that fund was abolished, and is well supplied with the necessary apparatus. It would be a great advantage to the health of the troops to provide similar covered gymnasia at all the Mediterranean stations.

The *Garrison Church* is a large convenient building, but insufficiently ventilated. It requires large louvres in the ridge and inlets for fresh air along the eaves.

Main Guard.—This is a large lofty casemate on one side of the gateway. It has three windows and a ventilating shaft, but the ventilation is insufficient for the number of men in it. The lock-up room is on the opposite side of the gateway. There are no cells, and all kinds of prisoners have to be put together in the lock-up. Cells are very much wanted.

Several of the buildings, containing engineer's orderly room, stables, military secretary's house, &c., are very old and not in good condition. They should be rebuilt.

Married Soldiers' Quarters.—None specially belonging to this barrack.

The sanitary improvements required for these barracks are:—1. Increased cubic space for the men. 2. Improved ventilation. Closing up the arches between the rooms and providing access from the outside to each room by terraces and platforms, also verandahs. Ventilating fire grates. 3. Improved ablution accommodation and baths. 4. Improved cooking apparatus. 5. Improved surface drainage and latrines. 6. Additional space for reading and recreation rooms. 7. Ventilation of the garrison church. 8. Ventilation of guard room. 9. Cells and married quarters.

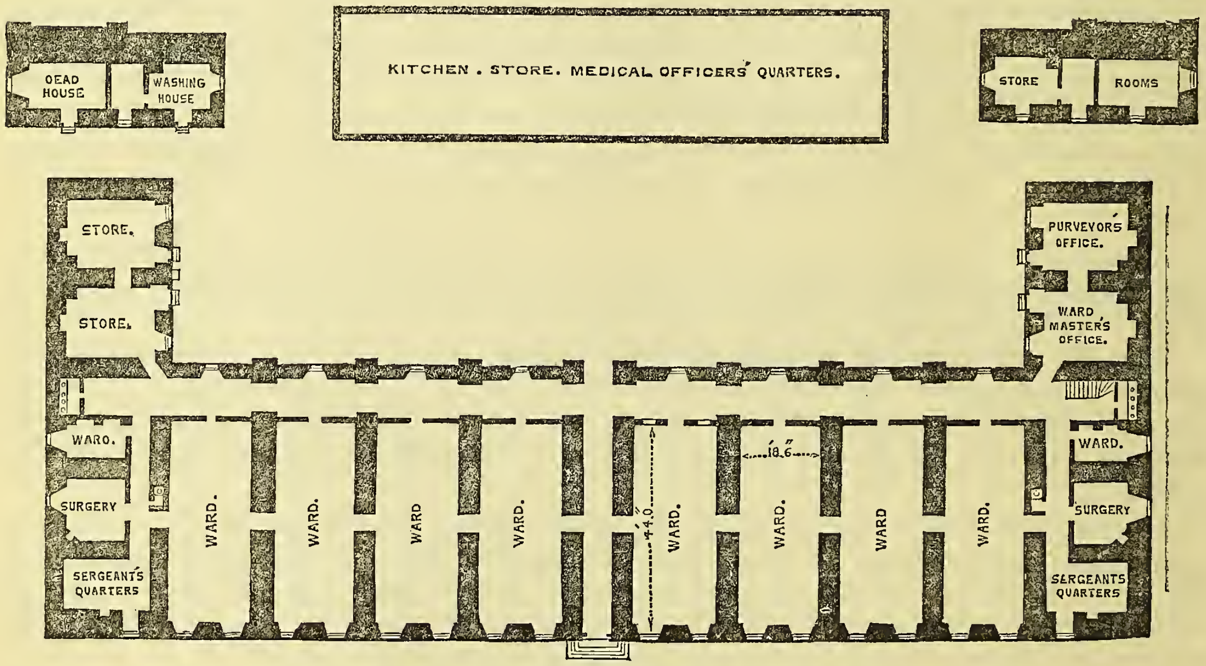
3.—Garrison Hospital.

This is a bomb-proof building two floors in height situated on a narrow neck of ground within the Citadel, 119 feet above the sea level, between the two high rocks already described. The building is erected east and west, and its windows face north and south.

The north side is freely exposed to all the cool breezes, except in so far as they may be interrupted by a line of trees extending along the esplanade. The south side is exposed to the sun, and ought to have the full benefit of the southern winds, but unfortunately a two story building has been erected, mainly for medical officers' quarters, parallel with the back of the hospital, and close to it, producing stagnation of the outer air, which in such climates as that of Corfu amounts to bad external ventilation. On the east and west sides the ventilation is also interfered with by the projecting rocky eminences.

The ground plan of the building is given in the following, Fig. 24. It has a front to the north, about 242 feet long, formed out of 11 arches on each floor, built side by side like a bridge, and the ends closed to form windows. The centre arches above and below are only sufficiently broad to afford a passage through the building. On each side of this passage there are four arches used as wards, and the terminal arches, one at each end, are divided by walls into three rooms, intended for serjeants' quarters, surgeries, and small wards for special cases.

Figure 24.—Ground Plan, General Hospital, Corfu.



It will be seen that all the larger wards communicate by doorways through the piers intervening between the arches, so that the whole ventilation of each floor is in common.

The end arches are continued out to the south behind the main line of the building, in the form of two wings used for store rooms, &c.; beyond these are two small buildings used as store rooms, wash-house, dead-house, &c. The building for officers' quarters, kitchen, &c., mentioned above, completes the fourth side of the narrow court behind the hospital. Beyond this line of buildings is a narrow esplanade overlooking the sea, and 100 feet above it, and against the wall bounding the esplanade is a row of very offensive privies drained to the sea, right to the windward of the hospital, and from which great nuisance is experienced both in the medical officers' quarters and in the hospital kitchen below them, as well as occasionally in the hospital itself.

It is worthy of remark that the only wards in the hospital in which there was a proper degree of freshness in the air at the time we were in them, were those wards on the upper floor which received the sea breeze, past the end of the medical officers' quarters.

Access is obtained to the upper floor of the hospital by an outside stair, carried up in the narrow court behind, still further obstructing the ventilation on that side. All the wards above and below are entered from an enclosed corridor, about three yards wide, which covers the entire south front of the building.

The prevailing winds during five months of the year are southerly, and interposed between these winds and the sick wards there are, 1st, the offensive privies on the esplanade, 2nd, the cook-house stores and medical officers' quarters, 3rd, the obstruction afforded by the stairs, and, lastly, the closed corridor along the south side of the hospital.

These structural defects constitute the most important features in the sanitary condition of the hospital, and we shall recur to them.

The hospital was constructed in 1835, and the following table shows the amount of accommodation it was originally intended to afford for the sick of the garrison.

Wards.	Regulation Number of Beds per Ward.	Dimensions of Wards.			Cubic Feet per Bed.	Superficial Feet per Bed.	Windows per Ward.		
		Length.	Breadth.	Height.			No.	Height.	Width
		ft.	ft. in.	ft.				ft. in.	ft. in
16	18	44	18 6	12	542	45	2 2	7 9 4 6	4 8 2 3

Overcrowding.—This table is quite sufficient to show the very inadequate appreciation of the extent of space required for sick men in such a climate, which prevailed when the hospital was built.

Several years ago the medical officers obtained the removal of six beds out of each ward, thereby increasing the space per bed to 814 cubic and 67 square feet, but a further reduction was considered necessary to enable the wards to be safely used. And the War Office decided that each of the present wards should hold seven beds and no more. The War Office decision, if carried out, would give 1,395 cubic feet, and 116 square feet per bed, and 112 beds for the whole hospital, leaving 108 beds to be otherwise provided for.

The total number of sick for which there was accommodation on the first allotment of space was 288. On the present allotment of 12 beds per ward the total number of beds is 192. But the present average strength of the garrison exceeds 2,200, and, unless the overcrowded state of the barracks, to which we have already alluded, be met by reducing the garrison, 220 beds with sufficient cubic space per man will be required to accommodate the sick. It has been proposed to obtain this accommodation by erecting additional hospitals at Vido and Fort Neuf. But before discussing this point we shall inquire what extent of accommodation the present buildings can be made to afford. In dealing with the question of altering the present buildings, we must distinctly state that the accommodation so obtained would be by no means all that could be desired as to quality. All we propose to do is to ascertain whether by any alterations we can obtain a larger amount of space for sick than at present, without incurring any additional disadvantage of a sanitary kind, or whether in seeking more space we may not be able at the same time to improve in some degree the general sanitary condition of the building. We believe this can be done.

By reference to the plan and the table of accommodation it will be seen that each ward is 44 feet long; and by including the portion of the corridor at the end, each ward may be lengthened to 53 feet. To render the additional space so obtained available for sick all the arched doorways between the wards would have to be built up, and all the partitions dividing the ward from the corridor pulled down. Each ward would thus extend from the front to the back wall, and would have no communication with any other ward. The corridor window would have to be made into an entrance door, and a lofty window extending to within a foot of the ceiling would have to be made on each side this new doorway. Entrance to the ground floor wards would be obtained from an open verandah supported on iron pillars, and to the upper floor by a terrace forming the roof of this verandah. By carrying the pillars up, they would support a verandah over the upper floor windows. The stair giving entrance to the upper verandah should, if possible, be carried up in the central passage, or at all events in such a way as not to interfere with the circulation of air in the court behind.

By effecting these alterations the contents of each ward would be raised from 9,768 cubic feet to 11,760 cubic feet, and considering the special difficulty of obtaining more space for extending the hospital in any other way, as well as the improved ventilation which would be afforded by the alteration suggested, we should propose to place 10 beds in each ward at 1,176 cubic and 98 square feet per bed. This would give space for 160 beds, and leave 60 beds to be otherwise provided for. These additional beds could be obtained by removing the medical officers' quarters, and converting part or the whole of the upper floor of the building where they are situated into sick accommodation at say 1,200 cubic feet per bed, but we cannot recommend this to be done unless the hospital kitchen were removed from its present position on the ground floor, where, in the event of the proposed alterations being carried out, it would be under a sick ward, a position always to be avoided, especially in a warm climate.

The only satisfactory method of obtaining the additional space required would be to raise an additional storey on the present building. Space for from 80 to 90 additional beds might be provided in this way, by forming a new set of wards to correspond to those on the other floors, and this would be the best ward space by far in the hospital. The present appropriation of the building behind would in that case be left as it is.

It is possible, however, that the walls of the hospital would not bear an extra story if made bomb proof, as the present hospital is intended to be. If so, we would suggest that the additional story should be of light construction, such as a wooden structure slated and ceiled, carried the whole length of the present hospital so as to form two wards for 28 men each, with the necessary ward appurtenances.

At all events the maximum number of beds which the present hospital will contain, without additions, if altered in the manner suggested, is 160.

We have stated the case under its various aspects, and we are of opinion that the least costly way of providing the accommodation so urgently required, while the garrison remains of its present strength, would be to add the proposed story, and to improve the present wards in the manner suggested.

Ventilation and Warming.—As already stated, the external ventilation of the hospital is defective, although its local position is well adapted for securing a free movement of the air. There are no special means of ventilating either wards or corridors. The wards have two windows facing the north, each of which is 7 feet 9 inches high, and two windows and a door opening into the corridor, these windows are only 4 feet 6 inches high. There is a small opening a foot square into the corridor over each door. The large space over the heads of the windows is unventilated, and is a receptacle for foul air. There is one window in the corridor opposite the door of each ward. We have already shown that the foul air of all the wards intermingles by the doors in the division walls and by the corridors.

There are no fire-places; warming is effected in winter by iron stoves in each alternate ward.

These arrangements are insufficient for keeping the air pure, and the following improvements are required:—1st. Each ward should have a fire-place with the largest size ventilating grate of the pattern shown on Plan IV. Space can readily be found for this. A foul air shaft having an area double that recommended in our report on barracks and hospitals for home stations should be carried up alongside the chimney to above the roof. It should be louvred above; and where it opens into the ward, there should be louvres to throw any chance down draughts of air in windy weather up to the ceiling.

The windows should all be lengthened to within a foot of the ceiling, and the added part of the window should open separately by cords, to ensure a thorough draught when necessary. Besides this there should be a ventilating inlet inserted at each end of the ward, close to the ceiling, and their conjoint areas, like those of the outlet shafts, should be double those required for home use. The ventilation is that shown in Plan XI., Figs. 1 and 2.

Water Supply.—This is derived from tanks partly supplied by rainfall, partly from the aqueduct. It is raised for use by pumps. It has been proposed to provide separate tanks for the aqueduct water, to prevent inconvenience arising from mixing both waters together. The available supply is sufficient for all purposes, but it requires to be better distributed to waterclosets, &c., by head pressure. In all hospitals hot and cold water should be available for the use of the sick, from water taps, and the only pumps should be force pumps to throw the supply to a proper height for constant use in cases where head pressure cannot be otherwise obtained.

Drainage, *Latrines*, *Waterclosets.*—The facilities for drainage are ample, and the distance from a vertical fall of 100 feet to the sea is not more than 50 yards. A two feet barrel drain is used to carry the sewage this distance. The surface drains are paved. They should all be flagged and the channelling very carefully done.

There is a set of latrines constructed on the south of the hospital against the parapet. They were very offensive, but have been replaced lately by Jennings' latrines, with water for cleansing. If the alteration has not abated the nuisance it would be advisable to ascertain whether some less objectionable position could not be found for them.

A number of waterclosets have been put up within the building, but these closets cannot be used. Some of them have been walled in, and the others are in such a condition that the sick have to walk across the court to the latrines already described, in all states of the weather.

Each end of the hospital requires three or four waterclosets on each floor. They should be constructed in a projection thrown out at the end of the proposed terrace and verandah. They should be of the most approved construction, properly ventilated, and supplied with water and drainage.

Ablution and Bath Accommodation.—There is no proper lavatory or bath accommodation. A small separate building in the back yard is divided into two portions, one being the dead house and the other the lavatory, in which are the ordinary moveable metal basins and tin baths. Such arrangements are not suited to permanent hospitals. The projecting buildings in which the waterclosets are to be placed should afford space on each floor for wash-hand basins with hot and cold water laid on. Three such basins, as those shown on Plan XV., and one fixed bath, also with hot and cold water laid on, would be sufficient for each end of each floor. That is 12 basins and four baths for the whole hospital. An additional slipper bath, on wheels, for each floor, would enable bed-ridden patients to be bathed in the wards when required. Space should be provided for containing the slipper bath. It should have taps for hot and cold water to fill the bath, and also a sink in the floor for running the water off after use.

Cook-house.—There used formerly to be four small kitchens belonging to this hospital. Lately these have been consolidated, and the cooking is now done on the ground floor of the large building behind the hospital. The kitchen is a light room 15 feet long by 14 feet 6 inches broad, and contains three boilers, two fire-places, and ovens, the latter liable to get out of repair. Wood is used for fuel. The cooking arrangements are, however, said to be sufficient.

Hospital Linen.—There is no wash-house for hospital linen. It is washed by contract away from the hospital. The present arrangements are sufficient.

Storage.—All the stores have been lately consolidated, and the present store accommodation is said to be ample.

Accommodation for Hospital Serjeants and Orderlies.—In describing the general plan of the hospital, we have stated that the arches at each end of the building are divided into three separate rooms on each floor. There are thus 15 of these small rooms. Two of them on each floor are used as hospital serjeants' quarters, two others are used as regimental surgeries, and the others as small wards, &c. There is no accommodation for orderlies, all of whom sleep in the wards with sick.

There are no ward sculleries, and there are no rooms from which the hospital serjeants or orderly on duty can see the entrances to the wards.

The accommodation for orderlies could be obtained as follows:—

One of the small rooms nearest the back of the building at each end should be fitted up as a ward scullery, with hot and cold water, sink, &c., and made accessible from the verandah and terrace proposed to be erected behind. There would thus be four ward sculleries, one at each end of each floor. Four rooms in the wings, two above and two below, nearest the main body of the hospital at present used as ward-master's office, stores, &c., should be set apart for hospital serjeants. There would be thus four hospital serjeants' rooms, one at each end of each floor, overlooking all the ward entrances. The present four rooms used as hospital serjeants' quarters would then be available for other purposes. If properly ventilated, each would hold three orderlies, and thus some of the accommodation required for orderlies would be obtained. The remainder of the orderlies might very well be accommodated in the wings, and whatever accommodation for displaced stores might be required could be otherwise obtained.

FORT NEUF.

We shall next describe the barrack accommodation at Fort Neuf.

Fort Neuf is situated immediately to the north of the town of Corfu, and forms an important part of its land defences. It is a very irregular work, occupying the summit and sides of a rocky limestone hill, rising directly from the sea to a height of 186 feet. The area of ground within the defences is 43 acres 9 perches. None of it, except the summit of the rock, presents any level surface, and the principal barrack is built on a narrow ledge of rock about 26 feet above the level of the sea, chiefly formed by scarping the rock behind. A small bomb-proof barrack occupies the flat summit of the rock, and there are several huts in bastions used as temporary accommodation for troops.

The fort is surrounded by nuisances, partly arising from a most offensive form of decomposition, attended by the disengagement of sulphuretted hydrogen gas, produced by the mixture of sewage and salt water already described.

At no great distance to the westward are the public and commissariat slaughtering places, all the blood and offal from which is allowed to pass into the shallow water along shore, giving rise to an intolerable nuisance, and infecting the air to a considerable distance. On the land side of the fort there is a large area of ground occupied by mules and other animals. The surface is a mass of filth, the odour from which is most sickening. It seems as if considerable pains had been taken to accumulate as much filth as possible, on land and water, all round Fort Neuf. It is only a special instance of the general neglect of sanitary precautions for which the whole place is so notorious. We have elsewhere dealt with this matter, and recur to it here only in its connexion with the sanitary state of the barracks.

4.—Lower Barrack Fort Neuf.

Lower Fort Neuf barrack consists of a single block of building, four floors in height, situated on the north side of the rock. The front of the barrack faces nearly north towards the sea, at a height of 26 feet above its level, and receives the full benefit of all the cool winds. On the south side it is close to the scarped rock, and there is, on this account, no possibility of free circulation of air through the building, except during winds.

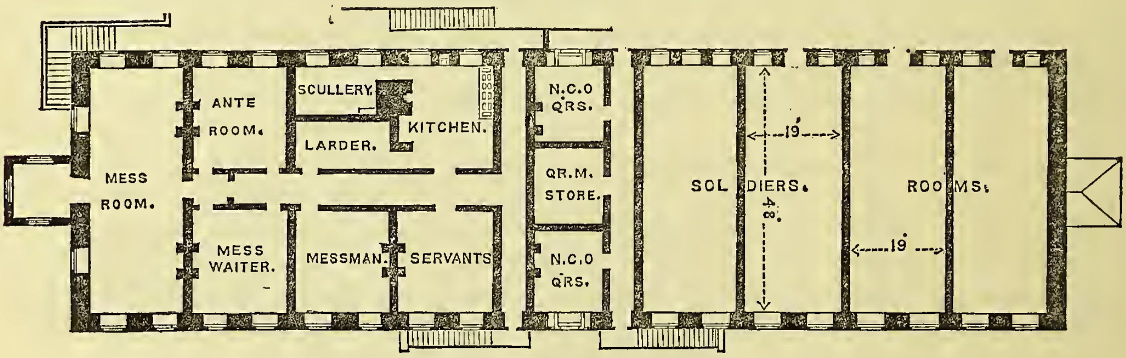
The lower floor is used as stores, canteen, &c. The three upper floors are partly used as officers' quarters, mess establishment, and stores, and they are partly divided into barrack rooms. There is a narrow parade ground between the lower story and the sea wall. A double outside stair rises from this ground to the first floor of the barrack, through which there are two passages leading to a narrow area behind, giving access to the officers' quarters and barrack rooms. The stories above are reached by outside stairs and verandahs behind, partly supported by the rock. All the rooms go through and through the building from back to front, and have windows and the door at opposite ends, the beds being arranged along the dead walls.

Each barrack room is 19 feet broad between the opposite walls, and 48 feet long between the opposite windows, of which there are two, opening to the north and overlooking the sea, and there are two windows, with the door between them, facing the rock. The construction is not a favourable one for ventilation.

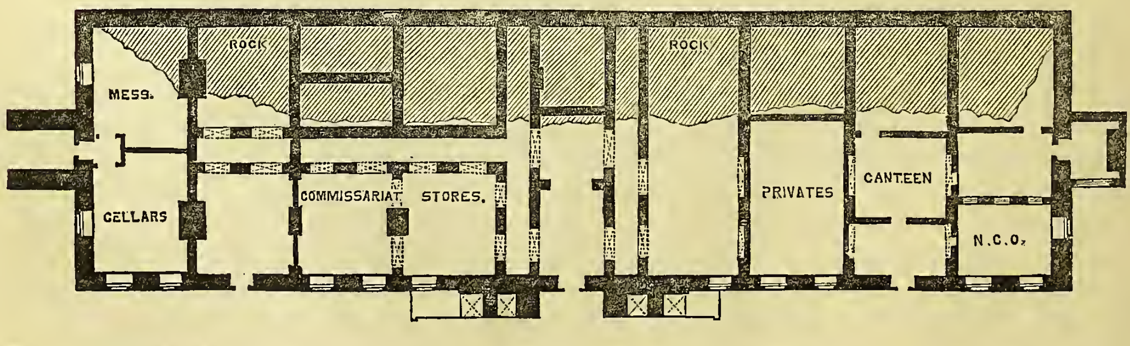
Fig. 25 gives a plan of the basement, showing the position of the rock, and also of the first floor, showing the arrangement of the officers' quarters and men's rooms.

Figure 25.—Plan of Lower Fort Neuf Barracks, Corfu.

First Floor.



Basement.



There are 12 barrack rooms and six non-commissioned officers' rooms, with regulation space for 270 non-commissioned officers and men. The details are given in the following Table:—

Number of Rooms.	Regulation Number of Men per Room.	Dimensions of Rooms.			Cubic Feet per Man.	Superficial Feet per Man.	Number of Men per Room at 600 Cubic Feet each.	Windows.		
		Length.	Breadth.	Height.				No.	Height.	Width.
		ft.	ft.	ft. in.					ft. in.	ft.
35 to 38, 4 rooms	24	48	19	13 0	494	38	19	4	8 0	4
41 to 44, 4 rooms	22	48	19	12 0	497	41	18	4	7 0	4
47 to 50, 4 rooms	20	48	19	11 0	501	45	16	4	6 0	4
Non-commissioned Officers' rooms, 32 and 33	—	15	14	13 0	2,730	210	—	1	8 0	4
Do. 39 and 40	—	15	14	12 0	2,520	210	—	1	7 0	4
Do. 45 and 46	—	15	14	11 0	2,310	210	—	1	6 0	4
Total -	264	—	—	—	—	—	212	—	—	—
Guard Room -	—	23	15	12 0	—	—	—	2	6 6	3
3 Cells - -	—	15	6	9 3	832	—	—	—	—	—
1 do. - -	—	15	12	9 3	1,664	—	—	—	—	—

Overcrowding.—We have in the preceding table given the regulation number of men, and also the number of men the barrack rooms would hold, at a little more than 600 cubic feet per man; but the regulation number does not represent the real number of men crowded into the rooms. On a late occasion there were no fewer than 30 men in each room. It will be seen that four men of the regulation number require to be removed out of each room, or 48 men in all. This measure would reduce the regulation accommodation in the soldiers' rooms from 264 to 212 men, which is the largest number they ought to contain, and on no account should the number be permitted to exceed this.

Ventilation.—This is effected only by doors and windows, when open, and by a few openings in the walls. There are no fire-places. The means are insufficient, and the structure and position of the barrack render it very difficult to insure good ventilation. We propose to introduce large shafts of the dimensions and construction described in Part I. of this report, carried from the ceiling of each room up the division wall, at an equal distance from each end of the room above the roof of the building, and also inlets for fresh air at each end of the room, close to the ceiling. Each room should also have a fire-place with a ventilating fire-grate. This is all that can be done to remedy the evil.

Ablution and Bath Rooms.—There is an ablution room 15 feet by 18 feet, in the ground floor of a range of buildings at the west end of the barracks. Water is laid on to the ablution table from the town supply, and there are the ordinary moveable basins and a drain to the sea. The place was soaked with water when we saw it, apparently because the men had to make it answer the purpose of a bath room, although there is no bath. It is too small and confined, and being under a room above, it is not sufficiently ventilated, and always damp. The adoption of fixed ablution basins and two freshwater baths in a separate room would remedy much of the present deficiency in the ablution accommodation. The room above the ablution room ought not to be inhabited.

Cook-house.—The cook-house is a detached building with windows and doors on all sides. It contains 10 boilers of the old construction, and is ventilated through the roof. Water is obtained from a tap close at hand, and there is a drain to the sea. There is no oven, but the men are allowed the use of a commissariat bakery for baking their dinners. Improved steel boilers and ovens (Plan XVIII.) should be provided.

Women's Wash-house.—This is a brick building of an irregular shape, having three fire-places and a boiler. There are no other conveniences. As there are no married quarters sufficiently near to make this wash-house of much use, it might be used as a bath room, and a wash-house might be provided where it is more required.

Latrines, Urinals, Drainage.—The latrines have troughs drained to the sea and washed out once in 24 hours. They are all offensive. One of them, indeed, taints the air to a considerable distance. They require to be reconstructed on Macfarlane's or Jennings' principle, supplied with water, and provided with divisions, doors, light, and ventilation.

The *Urinals* also require reconstruction on the principle shown in Plans XIII. and XIV. The present urinals are very offensive.

Drainage is partly effected by connexion with the town sewers and partly by direct outlets to the sea. The drains are of brick and stone. Their chief defect is in the outlets, which require to be improved in the manner elsewhere described.

Workshops.—There are tailors' and shoemakers' shops on the upper floor of the building containing the ablution room. They require roof ventilation. The tailors' shop has no cutting-out room.

Schools.—The school accommodation consists of an adult and infant school. The former is over the guard room, and has some ventilation, but not enough. It requires an additional louvre. The infant school is very small, and requires ventilation. There is a schoolmaster's quarter, without a kitchen.

The sanitary defects of Lower Fort Neuf barracks are as follow:—Bad local position defective construction, nuisances, overcrowding, defective ventilation, bad latrines and urinals, and insufficient means of cleanliness and of cooking. The first two cannot be remedied, but all the others can be dealt with, and were this done the barrack would be a very different place from what it is at present. We feel bound to state that at the time we saw it every part was scrupulously clean, and that the most was made of the means of personal cleanliness at the disposal of the regiment.

Water Port Guard Room.—This guard room belongs to the Ionian Government, and is usually occupied by a guard from Fort Neuf. It is situated at a short distance from the sea shore, close to the market and custom-house, in one of the most filthy and neglected localities of the town. It is surrounded by broken pavement, filthy drains, and other abominations. The buildings are very defective, and require thorough repair, and to be made healthy. The troops in them are employed on services useful only to the Ionian Government, all of whose guard rooms, which we have seen, are kept in the same bad state.

5.—Upper Fort Neuf (Bell) Barrack.

This is a recently-constructed bomb-proof barrack, situated on the summit of the rock. It consists of a centre, occupied as officers' quarters, and of two wings bent backwards at obtuse angles from the line of the front; enclosing a narrow court-yard between the barracks and the works. There is a small parade-ground facing the buildings. There are a number of huts in different parts of the work used as married quarters, and for other purposes, but the chief part of the accommodation is in the bomb-proof building.

There are two floors of barrack rooms running through and through the building. Those on the lower floor are entered each by its own door, which has a loophole on either side and a small square opening, recently added, above. At the far end of these casemates are three loopholes, but no windows.

The upper floor casemates are reached by stairs in the angles, and the barrack rooms open into each other. These rooms have a window corresponding to the doors of the casemates of the lower floor. They have also loopholes like the lower casemates.

Accommodation.—There are nine casemates occupied as barrack rooms. They are with one exception 32 feet in length (the exceptional one is 33 feet long). They are all 18 feet broad. They vary in height of wall from 6 feet 6 inches to 7 feet 4 inches, and their height to the top of the arch is from 11 feet to 12 feet. Four rooms have regulation space for 20 men each, at 283 cubic feet per man. Five rooms have regulation space for 16 men each, at 360 cubic feet per man.

This would give the total regulation accommodation as 160 men.

With proper ventilation there would be space for 9 men per room, and this barrack should have its regulation number reduced from 160 to 81 men. At present it is very much overcrowded, and not an unlikely place to predispose men to fever and other diseases notwithstanding its elevated position.

Ventilation.—None, except the doors and loopholes, with the small opening over the door. There is no provision in the construction by which the rooms could be ventilated except by wall openings. There should be windows where they can be substituted for the present loopholes, or if this cannot be done for reasons connected with defence, each loophole should be enlarged as far as practicable and supplied with temporary window frames with glass to be protected by loopholed shutters of iron. A louvred opening should also be made close to the crown of the arch, in the end of the casemate opposite the opening over the door. That is, *each end* of the casemate should have a louvred ventilating opening as near as possible to the crown of the arch.

Ablution and Bath Accommodation.—There is an ablution shed with a water supply, but no bath. One bath with water laid on is required. Water should also be laid on to the ablution table and the accommodation generally improved.

Cook-house.—This is in a casemate, and is provided with four boilers of the ordinary pattern. There is no oven. The improved steel boilers and a steel oven should be provided.

Latrines, Urinals, Drainage.—The latrine accommodation is very defective and noisome. There is drainage to the sea, but the construction is otherwise defective. Macfarlane's or Jennings' latrines well supplied with water would remedy the evil. The urinal is of porous stone, with a horizontal broad trough. It requires reconstruction and water for cleansing.

Upper Fort Neuf cannot be considered as a complete barrack. It is rather a part of the defences intended to be occupied when necessary. But in the scarcity of barrack accommodation it has been made to answer the purpose, like the old ruinous wooden huts in the neighbourhood, without much regard to considerations of health. Viewed in this light, the only good point about it is its elevated position and free external ventilation, but for all this it ought not to hold above one-half of the regulation number of men, and it ought to be improved in the points we have indicated.

Fort Abraham.

Fort Abraham is situated a short distance westward of Fort Neuf, from which it is separated by a deep valley. The sites of both forts rise nearly to the same height, but the works of Fort Abraham are lower than those of Fort Neuf. At the time of our inspection Fort Abraham was undergoing reconstruction. It had not been occupied for a long time, and had been falling to decay. One large stone building at its eastern end used to be occupied as a prison, and when we were there it afforded the only barrack accommodation except some wooden huts, erected in consequence of the strength to which the garrison had been raised having exceeded the possible barrack accommodation elsewhere.

The question of health, so far as regards this fort, resolves itself rather into providing healthy accommodation for its future garrison than into improving the present barracks. And this view of the subject is the more necessary, as we found that two large underground arches which had been thrown over one of the old ditches were proposed to be told off as barrack rooms. They would be useful as bomb proofs for sheltering men in case of siege, but they are totally unfit for barrack accommodation. We are under the necessity of objecting to the proposed plan, and are of opinion that whatever number of men are to be placed in the fort to garrison it in time of peace should have barrack rooms built for them. But as the whole area of the place is under 40 acres, the space available for building is very limited.

6. FORT ABRAHAM BARRACK.

The present barrack accommodation, such as it is, consists of one large room with an open roof 61 feet long, 40 feet wide, and 14 feet 8 inches high, forming the upper floor of the stone building referred to. This room has been allotted to 56 men at 639 cubic feet per man ; but on account of the height of the room each man has only 43 square feet. There are three windows three feet six inches high, by three feet wide, along one of the sides, and two windows five feet high by three feet six inches wide on one of the adjacent sides. None of the windows opened at the top at the time we were there, and the only dependence for ventilation was on the open roof.

This room would be much improved by opening windows on the other sides, and an additional story might be raised on the present walls to extend the accommodation. The open roof besides renders the place very cold and uncomfortable in winter. There is suitable space for increasing the accommodation by properly built huts, but not to any very great extent.

The officers' quarters are under the men's room and are very bad. Under these again are some quarters of a still worse description, occupied by married families.

There was no proper drainage. The latrines were connected with a most offensive cesspit; but we were informed that improved latrines were about to be constructed. All refuse is thrown over the wall of the fort, and there is a Jews' burial ground on the sloping ground outside. There was no ablution room, and the cook-house had boilers but no oven.

In carrying out the works the first thing to do is to determine how many men are to be placed in them. Next to extend the barrack accommodation on healthy principles, giving to each man 600 cubic feet, with sufficient ventilation, and fire-places with ventilating grates for winter use.

Suitable accommodation should be provided for officers, non-commissioned officers, and married people, instead of the present bad quarters.

The whole place should be drained to the sea, cesspits abolished, the latrines reconstructed, ablution and bath accommodation provided and water laid on for all purposes from the supply main. The cook-house should have a proper oven and steel boilers, and arrangements should be made for daily removal of barrack refuse.

The guard room was a Crimean wooden hut, which accommodated one non-commissioned officer and six men. A suitable guard room is required, and also a school room. The school room was in a casemate so damp as to be uninhabitable in winter.

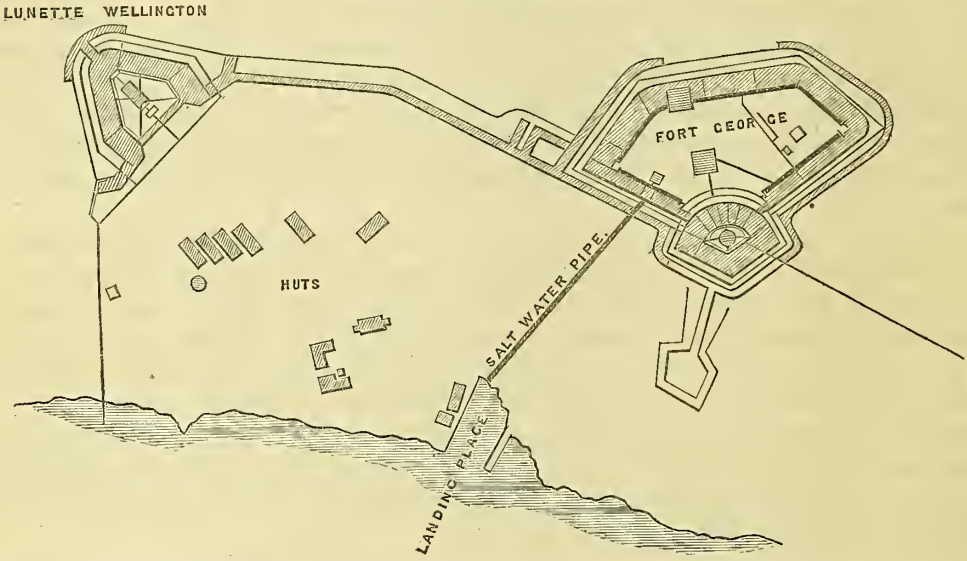
Vido Barracks.

There are three sets of barrack rooms in Vido, situated in three separate works, Fort George, Wellington Lunette, and Maitland tower. The two former occupy the highest ground on the south side of the island looking towards Corfu, and are connected by a covered communication about 800 feet long. Maitland tower stands on an isolated eminence overlooking the sea, on the north side of the island.

7.—Fort George, Vido.

Fig. 26 shows the general arrangement of the barrack accommodation in Vido in the two principal works, Fort George and Lunette Wellington.

Figure 26.—Vido Barracks.



Fort George is an irregular polygon with a tower at one of the angles. The greatest length of the work is about 600 feet, and its greatest breadth about 200 feet. The barracks and other buildings follow the shape of the work, and leave inside a parade ground of the same form. The whole work is sunk beneath the surrounding levels, so that only the parapet is visible from a distance; and the buildings are separated from the ground by a deep and broad ditch, on the outer side of which there are a number of casemates used for commissariat and purveyor's stores. The tower is similarly constructed. It is surrounded by barrack and other buildings, leaving a narrow deep court in the middle. This form of construction, of course, precludes any free external circulation of air, and renders a much larger amount of space necessary for the men than would otherwise be required for health.

The casemates of Fort George are at present chiefly used as a military prison, and some are occupied as married quarters, canteen, &c. The casemates of the tower are partly used as officers' and soldiers' quarters, partly as artillery stores.

In general character the barrack accommodation does not differ materially from that usually provided in similar works. The rooms have loopholes towards the counterscarp, and windows and doors towards the interior of the works. Some of the rooms in the fort itself are worse than others. Certain of them, occupied as married quarters, have their floors a foot or two below the level of the ground. The rooms in the tower are the best. They have two windows, one on either side the door, and they are entered from open galleries. Connected with the tower is a long casemate out of a counterscarp gallery, with no light or air, except from loopholes low down. It was occupied by men; the air in it was most offensive, and the whole place quite unfit for occupation. Some of the casemates in the fort have no direct ventilation. One barrack room is used as a hospital ward to receive patients until they can be transferred to the general hospital, Corfu.

As a whole, much of the accommodation not occupied as a military prison is of a very bad description, and were it crowded with troops, as is the case generally with the Corfu barracks, a considerable amount of sickness would inevitably be the consequence. Vido used formerly to be considered a very unhealthy station; it is now not so, but it is not fully occupied. The plan on which the barracks have been constructed would fully account for their sanitary state being dependent on the numbers of men in occupation, and what used to be attributed to climate has most probably been due solely to bad overcrowded barrack rooms.

The accommodation in the barrack part and military prison of Fort George is as follows:—

Barrack Rooms.	Regulation Number of Men per Room.	Dimensions of Rooms.			Number of Men at 600 Cubic Feet per Man.	Superficial Area per Man.	Windows.		
		Length.	Breadth.	Height.			No.	Height.	Width.
		ft. in.	ft. in.	ft. in.				ft. in.	ft. in.
Nos. 1 to 6, 6 rooms	No regulation	23 0	18 0	12 0	8	—	2 3 loop-holes.	4 0 1 0	5 6 1 0
Nos. 7 to 12, 6 rooms	No regulation	28 0	18 0	10 6	8	—	2 3 loop-holes.	4 0 1 0	5 6 1 0
Guard room	—	19 0	16 0	17 3	—	—	—	—	—
Military Prison.					Cubic Feet per Man.				
20 Hard labour cells	1	14 10	6 6	10 0	965	96	none.	—	—
18 Solitary cells	1	13 6	6 6	7 3	636	88	1	0 10	1 8
3 Cells	3	14 10	10 3	10 0	507	51	none.	—	—

Overcrowding.—There appears to be no regulation as to the number of men per room in these barracks, and the occupation appears to depend very much on the number of men sent to Vido for rifle practice. The allotment has varied at different periods from 16 to as many as 26 men per room, in a space barely sufficient for eight men. The barrack rooms have at times held 312 men in space barely sufficient for 96. From the peculiar structure of the work, such overcrowding should be studiously avoided. Better place the men under tents, if necessary, than crowd them into these rooms. The galleries and the casemates now used for married people should be struck off the accommodation altogether, and never used as barrack rooms except during a siege. They are quite unfit for ordinary habitation.

Ventilation.— No provision has been made for fresh air in the construction, and it will be very difficult to ventilate the rooms properly. The best way to do this would be to carry up a shaft from the top of the arch at the end opposite the door to above the parapet, as in Plan XI., Fig. 3, and to provide a louvred inlet for fresh air close to the crown of the arch over the door. If this cannot be done, there should be properly louvred openings at each end of the casemate, through the front and back wall, close to the crown of the arch.

Ablution and Bath Accommodation.—None. It is stated that the men wash outside their barrack rooms, or wherever they can, and bathe in the sea. A temporary substitute for an ablution room is formed out of an old gallery by placing in it a barrack table with basins but water is not laid on; and there is no drainage to carry off the water which has been used.

Cook-house.—There are two cooking places; one is in a casemate, and very hot. It is provided with four boilers and an oven. The other is a shed in the ditch, used in consequence of overcrowding of the barracks. Improved steel boilers should be provided.

Women's Wash-houses.—None.

Latrines, Urinals, Drainage.—The latrines are situated in a casemate, lighted by loopholes. They have troughs supplied with salt water by means of a tank filled from a force pump at the sea side, worked by prisoners. There is a latrine for women at the foot of the staircase of the tower. Both are very offensive and taint the air to some distance. They should be re-constructed on Jennings' or Macfarlane's plan, and supplied with water.

The drainage outlet from the men's latrines is partly into a small creek used as a landing-place, close to the point whence the salt water for flushing is taken. The outlet for the Tower drainage is into another small creek called St. George's Bay, about 130 yards from the tower. The former of these outlets is extremely offensive at times. The use of shallow bays or creeks of this kind for drainage outlets into a sea without tides is most objectionable. In the present case the outlet should be removed away from the landing-place to the open water, and carried out to a sufficient depth to prevent nuisance.

There is ample fall to enable any improvement required in the drainage to be carried out.

The court-yard of the tower requires to be flagged and channelled to improve its surface drainage.

There appears to be no urinal in this barrack. One is required, and it should have water provided near it for frequent cleansing.

Water Supply.—Fresh water is obtained from three tanks in the fort and one in the tower, which are supplied by collecting the rainfall from the works. It is not laid on for use, but has to be raised by pumps.

Married Quarters.—None, except casemates and galleries, affording a very inferior and insufficient kind of accommodation.

The School Room is in a dark casemate.

Guard Room.—This consists of two very close casemates. There is no cell nor lock-up attached to it The guard room and school both require more ventilation.

Military Prison, Fort George.

This establishment consists of 41 cells, the dimensions of which are given in the preceding table. They are entered from galleries occupying about two-thirds of the circumference of Fort George. The galleries face towards the ditch, and receive a very insufficient amount of light and air from loopholes. The cells are casemates divided, facing towards the interior of the fort, with which they communicate by means of small ventilating openings through 18 feet of solid masonry. The consequence is that the ventilation is imperfect. The whole place was very clean when we saw it, and appeared to be well managed, but it is certainly a very necessary improvement to allow more fresh air to enter the cells, especially to the refractory cell. There is a stove in the passage for warming in winter, but it does not supply fresh warm air. It only warms the comparatively impure air of the interior. A simple stove constructed to warm a supply of fresh air drawn from without should be substituted for the present one.

There are certain obvious defects arising from the nature of the structure. In many of the cells the division between the prisoners is defective, and they can talk to each other. The infirmary cells are not fit for sick. The cell doors have iron gratings.

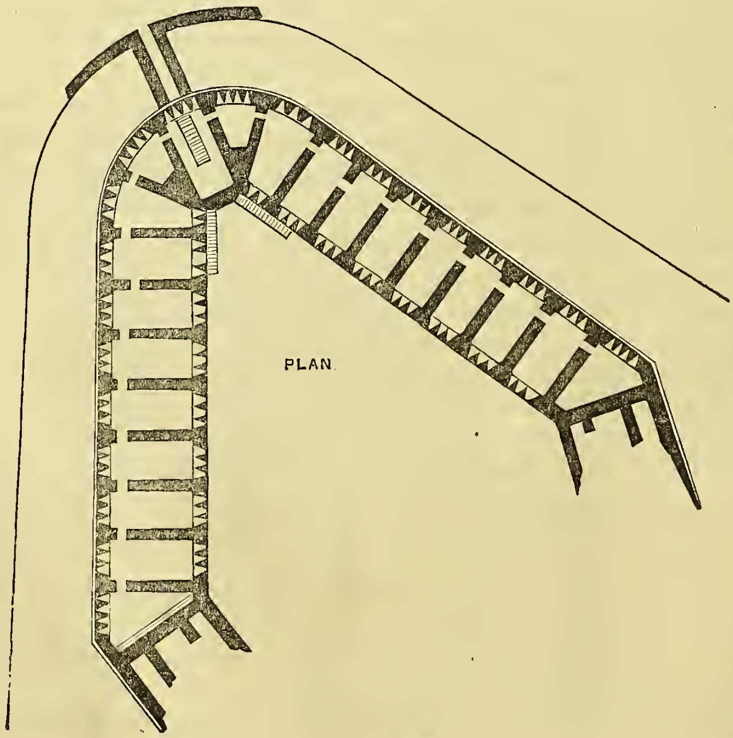
Improved ventilating and warming arrangements should be carried out, but the nature of the work renders structural alterations of any extent impracticable.

8.—Lunette Barracks, Vido.

The barrack accommodation in this work consists of a number of casemates on one floor, built in four out of the five sides of which the work consists. Part of it is occupied by officers, and the remainder by rank and file. The men's barracks are in two rows of casemates, built in the projecting angle of the work. One end of the casemates faces to the court and the other to the ditch. The court face has in the majority of cases a door and two loopholes, but one or two casemates have no outer door, being merely entered from other casemates. The end towards the ditch has three, and in a few instances four loopholes, which afford very insufficient light to the interior. All the rooms communicate by doors in the piers, at the end furthest from the entrance to the casemate.

The nature of this work will be better understood by reference to the following Fig. 27.

Figure 27.—Ground Plan of the Lunette Barracks.



There are in all 14 men's rooms, and the following Table gives the statistics of the accommodation :—

Rooms.	Regulation Number of Men per Room.	Dimensions of Rooms.			Cubic Feet per Man.	Superficial Feet per Man.	Windows per Room.		
		Length.	Breadth.	Height.			No.	Height.	Width.
		ft. in.	ft.	ft. in.				ft. in.	ft. in.
No. 1	4	31 6	14	8 6	1,150	110	3	1 0	1 0
13	10	31 6	14	8 6	460	44	2	6 6	4 3*

* These dimensions apparently include the splay, as the openings are only tall loopholes.

Overcrowding.—The 13 rooms in the table, with 10 men each, ought not to contain more than seven men per room, which would give somewhat more than 600 cubic feet per man.

Ventilation.—Each casemate has a shaft a foot in diameter, carried up through the crown of the arch at the end nearest the door, where it is not required, and an inlet at each end, close to the soffit of the arch. Some of the casemates have an opening only at one end. There should be an opening a foot square at each end of each casemate, properly louvred to throw the air upwards towards the roof. The upcast shaft should be improved by having louvres at the top on Muir's principle, Fig. 19, to keep out the rain, and to obtain the benefit of external air currents in ventilating the rooms. The doors between the casemates at the further ends are injurious to ventilation rather than otherwise, and should be closed.

Ablution and Bath Accommodation.—None.

Cook-house.—There is a cook-house in the casemate next the salient. It has six boilers, but no oven. The door is small. There should be an opening above the door for ventilation.

Women's Wash-house.—None.

Latrines, Urinals, and Drainage.—There is no latrine within the Lunette, but there is a urinal. The latrine is situated outside the works, and is drained by a small branch to the main drain, which is carried down the slope to the sea. The ditch and urinal are drained to the same main. The urinal should be supplied with water.

Water Supply.—This is obtained from a tank in the middle of the work, to which the rainfall from the roofs is led by pipes. Water is not laid on for any purpose.

Barrack Huts.—Between Fort George, the Lunette, and the sea, five brick huts have been built to extend the barrack accommodation. They are erected on sloping ground. The lower end of the hut is sufficiently raised above the level for ventilation beneath, but the upper ends of one or two huts are scarcely raised enough. The drainage of the higher part of the ground requires to be carefully cut off from the site. Each hut is 60 feet long, 17 feet wide, and 9 feet high, and has eight windows 3 feet square placed on opposite sides. There is no regulation as to the number of men, but we have been informed that the huts were intended for 40 men each, which would have afforded no more than 229½ cubic feet per man. They have been occupied by 28 men, which would give about 328 cubic feet per man. They would hold with safety 16 men each, which is the number that ought to be placed on the door.

The huts have louvres in the roof for ventilation, but those we saw were closed up, showing some imperfection in the construction. The louvre in such a climate as Corfu should admit of regulation during winter.

The huts are too narrow, and the windows are too small; they are, nevertheless, better than most of the barrack accommodation at Corfu, but they want fire-places.

9.—MAITLAND TOWER, VIDO.

This is an isolated work, situated on a knoll over-looking the sea. The barrack accommodation consists of a large circular room, 19 feet 10 inches in diameter, and 11 feet high, occupying the middle of the tower, and of four cross rooms, each 16 feet long, 14 feet wide, and 9 feet 3 inches high, extending from the circle. Each room has a window 5 feet high and 3 feet wide, and there is a shaft carried up from the ceiling of the circular room to the platform above.

There is no regulation as to the number of men, but the usual complement is 28 men, at 450 cubic feet per man. There is space for 21 men, but for no more. In so small a barrack, by taking advantage of the central shaft, the ventilation would be sufficient if one of the top panes of each window were replaced by a moveable pane, to fall inwards, like Sherringham's ventilator.

There is no ablution room, and no oven in the cook-house. There is a disused watercloset, and a latrine outside.

Some ablution accommodation is indispensable. The cooking arrangements should be improved, and also the latrine.

II.—PAXO.

1.—Topography and Climate.

Paxo is a small island about 9 miles in length and 4¼ in breadth, lying about 8 miles south-east of Corfu. It consists of an irregular mass of hard limestone rock, rising 800 to 900 feet out of the sea, with steep or precipitous sides, indented by small bays partly formed by small islands. The surface rises irregularly into heights separated from each other by shallow ravines. There is very little soil, except in the ravines, and the chief vegetation consists of olive trees, which cover almost the entire island, even to the highest points. There is no stagnant water anywhere, and no marshy land, properly so called. There is an area of tolerably level ground of some extent on which the town of Gajo, the capital of the island, is situated. Part of this ground is at or below the level of the sea. It is formed of loose débris, and receives the natural drainage of a considerable part of the island, which flows down the rapid slopes and ravines towards the small bay on which the town is situated. Most of the houses we saw in the interior of the island are built on slopes, without any precautions for protecting them from drainage from above. They are generally imbedded among trees and heights, with a considerable quantity of decaying vegetable matter around them and among the trees, so that, except in high winds, there always must be a greater or less stagnant, damp, malarious state of the atmosphere. The sites for the town and villages are indeed not such as would be chosen were the object to avoid malarial disease.

The population of the island numbers probably 5,000, about 300 occupying the town of Gajo. The town consists chiefly of detached houses, and has externally a more neat and clean appearance than most other Ionian towns; but, like all of them, it is badly drained. It has no proper water supply, and there is ample room for improved cleansing in and around the houses.

The houses are built along the curve of the bay, which is quayed in front of them, but, as the ground is pervious to water, it is infiltrated by the sea, and the wells are brackish. The town hence stands on ground in which fresh-water drainage from higher levels, and salt-water from the bay, intermingle. The position is convenient for commercial purposes, but it is an unhealthy one, although there is ground within a very short distance which would afford as healthy a site for houses as any in the island.

The whole water supply is derived from rainfall, by surface drainage, or from wells. There are no streams or lakes in the island. During rain the water is conveyed to large underground tanks, one of which, of considerable size, was in process of construction at the time of our visit. Water obtained in this manner is very liable to impurity from organic matter, and it requires thorough filtration before being passed into the tanks.

Among so limited and sparse a population no very extensive works of water supply are required, but a very cursory examination is sufficient to show that, for the town of Gajo at least, both the quantity and the means of distribution could be easily improved.

The only meteorological instrument at the station is a thermometer, by which the following observed mean temperatures have been obtained; but the observations are too incomplete to give any other than approximations to the truth.

FOUR YEARS' OBSERVATIONS, from January 1856 to December 1859.

Months.	Mean Maximum.	Mean Minimum.	Rain.	Winds.		Days of Sunshine.	Rainy Days.	Remarks.
				Direction.	Force.			
	°	°						
January - -	57	50	Rainy	S.E.	Moderate	16	10	Cloudy
February - -	56	46	Do.	S.E.	Do.	15	11	Do.
March - -	54	50	Do.	S.E.	Do.	9	14	Do.
April - -	68	57	Do.	S.E.	Do.	26	2	Clear
May - - -	74	61	Dry	S.W.	Do.	30	—	Do.
June - - -	78	71	Do.	N.	Calm	31	—	Do.
July - - -	87	71	Do.	N.E.	Do.	31	—	Do.
August - -	84	70	Do.	N.E. & S.E.	Do.	30	—	Do.
September - -	79	72	Do.					
October - -	76	66	Rainy	E.	Do.	30	—	Do.
November - -	59	51	Do.	S.E.	High	6	18	Cloudy
December - -	59	42	Do.	S.E.	High	5	20	Cloudy

The climate is stated to be good and healthy, dry and warm in summer; but rather cold, very variable and damp in winter.

There is nothing in the climate specially to occasion disease; and yet the native population is said not to be healthy.

2.—DISEASES OF NATIVE POPULATION.

There are no statistics to show the prevailing diseases; but from inquiries on the spot, we learned that in Gajo, at least, periodic fevers are more or less prevalent, accompanied with enlargements of the spleen, and that scrofulous diseases exist to some extent. The low damp position of the town, and the state of the drainage and water supply, are quite sufficient to account for the occurrence of such diseases.

3.—MORTALITY AND DISEASES OF TROOPS.

The troops stationed at Paxo occupy a small fort which crowns the summit of the island of St. Nicolo, a rock about three miles in circumference, and between 80 and 100 feet high, occupying the middle of the bay, on the shore of which Gajo is situated. This island reduces the bay to a channel about 200 yards wide, and protects the port towards the sea; completely covering the town, which only becomes visible on passing inside the island.

The position is freely exposed to all the healthy winds, and is out of the reach of any sources of malaria, except such as may proceed from the island of Paxo itself.

There were 33 men in garrison at the time of our visit, and there were no sick in hospital. The strength varies in different years. It averaged 41 during the 10 years 1837 to 1846, for which years the mortality is first given in the reports of sickness and mortality in the army (1853). During these years the admissions to hospital averaged 973 per 1,000 strength; and the deaths were 24 per 1,000. Fevers were the cause of 244 admissions per 1,000, and of 17 deaths per 1,000 strength. The most fatal disease was continued fever, the mortality from which was 1 in 11 of the attacks, or about five times the usual proportionate mortality.

A return has been made for us of the diseases among the troops for nine and three-quarter years, from April 1850 to December 31, 1859, from which it appears that the aggregate strength during this period was 350, the admissions to hospital 398, and the deaths three, giving a ratio of about 1,136 per 1,000 strength of admissions, and about 8 per 1,000 deaths. Fevers occasioned 188 or nearly one-half the admissions; and out of the whole number there were only 12 admissions from intermittent and three from remittent; all the others were from continued fever. Two out of the three deaths arose from pulmonary diseases. There was no death from fever.

In the year 1859 there were 37 men in garrison, and there were 37 admissions to hospital, but no deaths.

The strength in 1860 amounted to 33 men; 32 were admitted to hospital, of whom 24 suffered from continued fever. There was not a single case of periodic fever during this year.

We have already referred to the increase of fever at Corfu in 1861, and it may be useful to compare with it, the amount of disease at Paxo during the same period. The strength in this island was 33 and the admissions 33 during the first nine months of the year, but no deaths occured; of these 33 admissions, 21 were from fever. Of the fever cases 11 were intermittent and 10 continued.

The evidence taken as a whole goes to prove that continued fever is the most common form of febrile disease at Paxo. This is indeed distinctly stated by the medical officer in his report to us; he also states that the cases are slight, and that they are most numerous in June, July, and August. There is little or no disease during the cooler period of the year.

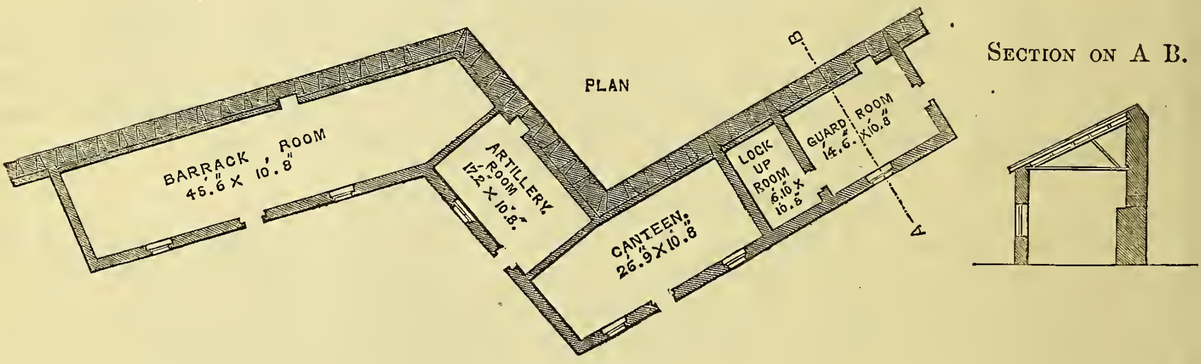
We next proceed to describe the barrack accommodation.

4.—Fort St. Nicolo Barracks.

Fort St. Nicolo is an irregularly shaped work defended by a low wall in bad repair on the side next the sea. On the side towards the island the wall is in a better condition, and forms two flanks, between which the gate is situated. The barrack accommodation is a lean-to shed built against this part of the wall. It consists of a school-room, one married quarter, canteen, guard room and lock-up, cook-house, store, and one barrack room for 28 men. This room is 97 feet 11 inches long, 10 feet 8 inches broad, and 11 feet 8 inches high. It is built round the curtain flank, and is very dark. The cubic space per man is 436 feet and the superficial area is 37 feet. The room is overcrowded to the extent of eight men, and should never hold more than 20 men. The only means of lighting are small low windows, the tops of which are only eight feet above the floor, and loopholes through the outer wall, almost always closed. There are no means of ventilation, and no fire-places.

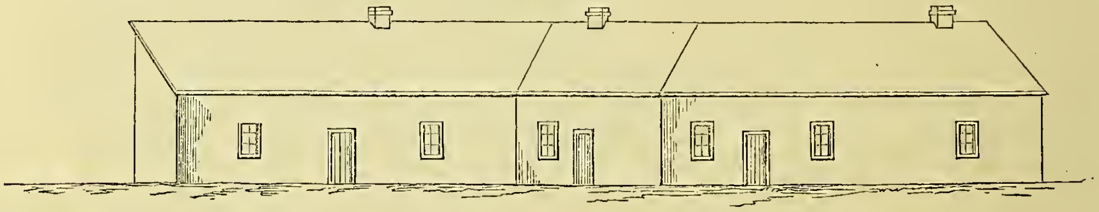
Fig. 28 shows better what the accommodation really is than any verbal description could do.

Figure 28.—Paxo, Plan of the Barrack Buildings.



Section on A B.

Elevation.



The accommodation is complained of as being very damp, and the men have to clean their rifles several times a day to prevent rust. This fact, together with overcrowding and absence of ventilation, is an important element in accounting for the fever. The dampness is attributed to deliquescent sand having been used in building and plastering. The rooms have wooden floors without any passage of air beneath, a defect always of serious consequence to health in warm climates.

The accommodation is very uncomfortable; the room is far too narrow, and it does not admit of material improvement. The best thing to do would be to erect a good barrack hut, raised above the ground, with fire-places, ventilation, sufficient window space and verandahs to afford 600 cubic feet per man, for say, 30 men; and any force above this number might be provided for in the present barrack.

In the meantime the room requires ventilation by louvered shafts through the ridge, and inlets along the eaves, additional light, which would be most easily admitted by skylights, and fire-places with ventilating grates. There is no shade for the men during the hot summer weather; and a verandah would be of great service.

Drainage.—There are ample facilities for drainage on all sides; but there are no drains except surface drains used for conveying roof and other surface water to the tanks, all fluid refuse from privies, urinal, cook-house, lavatory, &c., is allowed to escape among the rocks down the hill as it best can. With so excellent a fall every drop of refuse water could be removed to a safe distance by a small pipe drain, and the danger of polluting the water supply entirely prevented.

There is a privy away from the barracks, outside the fort wall; it is a mere pit, with ladder seats over it, and an opening for cleansing; all fluid runs down the hill.

This state of the drainage should be considered with reference to another point which has been often a cause of complaint; namely, the want of vegetables at Paxo. Very few are reared on the island; and the men suffer from the absence of this important element in wholesome diet. There is a small area of land at the foot of the hill on which the men would gladly cultivate vegetables if the land were rented for them. We are of opinon that this should be done, not only for the reason stated, but because the whole drainage of the barrack could be most advantageously used for manuring the ground, a process which would render the sewage entirely innocuous; and the men would find something to occupy them in a place where at present they have nothing to do, except their guard duties.

The levels are so favourable, that all the ablution and other refuse water could be conveyed to a Macfarlane's latrine of three seats, in which this waste water could be used in default of any other; and the whole could be conveyed down the hill to a tank close to the vegetable garden, and thence distributed on the ground.

Water Supply.—There is no source of water available except rainfall collected from the roofs and from the surface of the barrack yard, whence it is conveyed by cemented open drains to sand and gravel filters, through which it is passed into two under-ground tanks, one having a capacity of 6,280 the other of 1,858 gallons. The quality is stated in the return to be pure and good, and the amount sufficient; but supposing the tanks to be full at the beginning of the dry weather, which lasts five months, from May to September inclusive, the whole storage would allow only $1\frac{2}{3}$ gallons a day per man for 33 men, an amount certainly far from being sufficient. Besides this we find from a return of the cost of supplying water to different stations (Appendix 11), that in 1856 the sum of 102*l.* 5*s.* 9*d.* was paid for 6,428 barrels of water carried up to the fort during the year; a sum equivalent to a water-rate of about three guineas per man.

This would represent a capital quite sufficient, to say the least of it, to provide a sufficient water-supply for the garrison for all purposes, including water latrines and drainage. The only way to do this would be by additional tanks or by a well.

There is one point as regards the manner of collecting the water which requires improvement. At present the whole of it is conveyed to the tanks by open surface drains liable to pollution. All the roof water, at least, could be conveyed to one of the tanks direct by pipes, and used for drinking and cooking. The water collected from the surface of the barrack yard could be conveyed to the other tank, and might be used with safety for all other purposes.

Ablution and Bath Accommodation.—There is an ablution shed with a stone bench outside the fort wall, and water has to be carried to it from the tank inside the fort. This accommodation should be improved and placed nearer the men's rooms. The refuse water, instead of being thrown about as at present, should be disposed of in the manner already mentioned. There is no bath; the men bathe in the sea. One bath at the sea shore, where the men could wash themselves thoroughly with marine soap and salt water, would be the best arrangement here, on account of the deficiency of fresh water.

Cook-house.—The cook-house is in the same line as the soldiers' quarters. It has two rectangular boilers and an oven, but the allowance of wood, 2 lbs. per man, is said to be insufficient for cooking. It would be enough if steel boilers and an oven were provided. The cook-house itself requires ridge ventilation.

Guard Room.—The guard room is intended to accommodate a corporal and three privates. It was used as a married quarter when we saw it. It requires ventilation, like the other parts of the building.

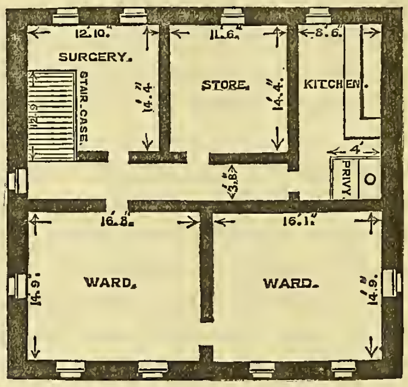
The history of this small detachment barrack shows that notwithstanding its elevated and healthy position it has not escaped the diseases of larger and less favourably situated stations. The sanitary defects we have enumerated are quite sufficient to account for this fact, and if they be removed in the manner we have pointed out, there will be improved health among the troops.

There are no officers' quarters in the fort. The officer commanding and medical officer are quartered in the town, in by no means so good a position as the fort.

5.—HOSPITAL, PAXO.

The hospital, a plan of which is given in Fig. 29, is a hired house on the quay at Gajo, exposed to the same local conditions with regard to drainage and water supply as the other houses in the town. The only favourable points about it are, that the sea breeze blows into the windows, that the house is three floors in height, and that the sick occupy the uppermost floor. Below the wards are the medical officer's quarter, occupying the first floor. The ground floor on the level of the quay is unoccupied, and so damp that there is no difficulty in understanding how people who live on these ground floors suffer from malarial disease.

Figure 29.—Plan of Hospital, Paxo.



The following is the accommodation :—

Wards.	Regulation Number of Beds per Ward.	Dimensions of Wards.			Cubic Feet per Bed.	Superficial Feet per Bed.	Windows.		
		Length.	Breadth.	Height.			Number.	Height.	Width.
		ft.	ft.	ft.				ft.	ft. in.
1	4	17	15	9	574	64	3	4	2 10
2	4	16	15	9	540	60	3	4	2 10

If the wards were occupied up to the regulation, which fortunately they are not, the overcrowding would be excessive. The rooms should hold no more than two beds each. With this small number of beds the ventilation by windows would be sufficient.

On the same floor as the wards, but separated from them by a passage, is the surgery, a store, and a small kitchen. In the corner of the kitchen is the privy, which is simply an open pipe descending within the house to a drain in the basement, up which the sea washes ; forming altogether a very dangerous contrivance to have within a hospital. It is stated not to be used by the sick, if this be the case the privy should be removed altogether. If it is to be used it ought to be made into a watercloset, properly lighted and ventilated, and boxed off from the kitchen.

There is neither lavatory nor bath, only basins brought into the ward, and a foot-pan. There is no place for convalescents taking exercise except along the quay in front.

This hospital is simply a private house and nothing more. Its best recommendation is that it is not much used, but as a rent must be paid for it and as the position and accommodation are not good, a small hospital hut with all conveniences for the average number of beds occupied, similar to that shown in Plan XX., should be erected within the fort, which would be on every account a better and more convenient locality.

III.—SANTA MAURA.

1.—Topography and Climate.

This island was at one time a peninsula, connected with the coast of Greece by a narrow low neck of land, cut across in ancient times to allow of small vessels passing between the island and the mainland without incurring the hazards of the tempestuous sea along the west coast. The island is about 30 miles in length by four in breadth. It runs nearly parallel with the main land of Greece, leaving a channel of varying breadth between the mountains of the two opposite coasts, terminating at its north end in a shallow strip of water, three miles in length, and varying in breadth from 100 yards to a mile and a half, almost enclosed at its northern end by low narrow spits of land, and forming the lagoon of Santa Maura.

The island is simply a mountain ridge of limestone, rising in some places to about 3,000 feet above the level of the sea, with lateral spurs, between which are several valleys, opening to the east and south. Along the whole of its western and northern sides the island is precipitous, and at some points presents lofty white escarpments, from which its ancient name was derived.

The interior of the island is mountainous, with here and there small lakes and patches of marshy ground, the emanations from which affect the general health of the population at certain seasons.

Agriculture is still in a rude state, and the absence of drainage exercises an injurious effect on health.

That part of the island with which we have chiefly to do is the northern extremity, where the lagoon joins the sea. At the point of junction, but in reality more connected with the coast of Greece than with the island, was constructed on a spit of land the mediæval fort and church of Santa Maura, formerly the residence of the Venetian Government, and now the military station of the island. Its distance is a little more than a mile from Amaxechi, the present capital of the island: formerly a small sea side port, for the convenience of trade between the island and Santa Maura, the real capital. Out of this combination of circumstances it has arisen that a considerable part of the population of the island has become clustered at its northern extremity on one of the most unhealthy tracts of country to be found in the east.

The unhealthiness is partly due to local position, partly to absence of proper sanitary works. The local health authorities with whom we communicated appeared to be perfectly aware of the causes of the unhealthiness, and also of the class of improvements required to mitigate them; but hitherto little or nothing appears to have been done to improve the town.

We shall describe briefly the present defects in so far as these have an influence on the general health of the neighbourhood where the troops are quartered, and generally the nature of the improvements required.

At this end of the island the mountain chain runs nearly parallel to the western side of the lagoon for a distance of about four miles. The mountain slope is very rapid, and at the foot of it there is a strip of almost flat country from one and a half to two miles in width, only a few feet raised above the level of the water, extending from the foot of the slope to the lagoon. From the northmost point of the island a narrow spit of low land, about a mile and a half in length, projects almost due north into the open sea, and is then bent on itself at a right angle towards the east, for a distance of two miles. There is a narrow passage only a few yards wide between the end of this spit and the fort, which occupies another spit of land running north-east towards the coast of Greece. Between the fort and the mainland there is at this point an expanse of shallow fordable water, about a quarter of a mile broad.

These tongues of land enclose the shallow water of the lagoon towards the north, and there are narrow openings at the fort, between the lagoon and the sea, quite insufficient to insure a current through it. Under a hot sun the atmosphere all over becomes charged with moisture, and ready to intensify any sources of malaria existing along the shores.

The relation of the fort to the adjoining sources of malaria is shown in the Plan No. XXXIV.

There is no evidence, however, to show that the water of the lagoon, *per se*, is a source of malaria. The water covers its bed, because there is no tide. But the action of the wind may expose to a greater or less extent the banks about the fort on which there is a mingling together of vegetation and sea water, such as in warm climates is productive of malaria; on the other hand the fort is exposed to every wind from the sea, an advantage which tends to neutralize malaria proceeding from such sources. But the chief sources of malaria are in the low land of the island itself, in the vicinity of Amaxechi. This land consists of a deep rich soil covered with olive trees and other kinds of cultivation, even to the outskirts of the town. It receives the whole of the drainage from the mountain range behind it. Part of this fresh water disappears by evaporation, part escapes by water courses through the subsoil to the lagoon. Much has been done at different periods to relieve this rich soil of its superfluous water by deep trenching and draining, and some of these trenches appear to be used in very dry weather for irrigation; but much yet remains to be done to the westward and north-westward of the town, the direction from which malaria comes with greatest intensity. Even at the end of the dry season some of the trenches contained stagnant green water, giving off a faint sickly odour, at the time we were there.

The health of the district would be much improved by extending this drainage. It should be made a public object to do so, and it would amply repay its cost in improved health and productiveness.

So far as concerns the health of the troops, there can be no doubt that the whole of that part of the island nearest the garrison is unhealthy from malaria, the result of topographical position and insufficient drainage.

Climate.—The only meteorological instrument at the station is a thermometer, and the only information we have been able to obtain as to the elements of climate is the following, including the period between July 1856 and April 1860.

Months.	Thermometer.			Number of Rainy Days per Month.
	Mean Temperature.	Mean Maximum.	Mean Minimum.	
January	51	59	44	7
February	52	61	44	8
March	56	65	47	7
April	64	71	53	4
May	67	75	62	5
June	72	78	59	4
July	79	86	72	1
August	80	88	72	3
September	73	82	65	4
October	72	82	63	5
November	64	74	55	8
December	55	66	47	8

Imperfect as these dates are they show great diurnal variability, attributable to the local position of the fort, which is exposed to the hot moist winds coming up the lagoon from the south-east, and the cooler sea breezes from the north and north-west. Besides this, the neighbouring coasts of Greece and Albania are very mountainous, and are the source of cold winds, especially in winter. The summer is hot, the winter very variable, but the climate, *per se*, apart from malaria is found to be healthy. Fever and diarrhœa are said to be the prevalent diseases of the summer months.

2.—Diseases of Native Population.

Appendix 12 contains a table of the population and mortality of the island for a period of five years, and also the admissions and deaths into the civil hospital at Amaxechi for the same period.

This return gives the average population of the island at about 20,500, and the average annual deaths for five years at 388·8, or less than 19 per 1,000 per annum.

The most prevalent fatal diseases are stated to be remittent and intermittent fevers, inflammation of the chest and abdomen, tubercles of the lungs, and marasmus in children. The nature of the fatal diseases leads us to suspect that the mortality must be greater than the amount given in the table, that many deaths must be unaccounted for; and that the registration is incomplete.

The hospital table shows that above 34 per cent. of the admissions were due to fevers, about half of which were periodic in character.

3.—Sanitary State of Amaxechi.

Amaxechi, situated in latitude 38° 50′ N., longitude 20° 40′ E., is an irregularly built town of about 4,000 inhabitants, with open suburbs extending among the olive trees by which it is enclosed on the land side. The houses are partly of stone, partly of wood, many are on one floor, the remainder are in two floors. It is a miserable looking place, and the inhabitants generally have a pale, sickly, malarial, unhealthy appearance.

The chief diseases to which they are subject are remittent and intermittent fevers, with cases of a typhoid nature. There is much spleen disease; and mesenteric disease is stated to be very prevalent among children.

The sanitary state of the town is nearly as bad as possible. It has no drainage, only open gutters teeming with every abomination passing in front of the houses. When we were there these surface gutters were full of putrid water and filth; the paving bad; the town badly cleansed. There appear to be no latrines, and everything is thrown into the street, and taken away afterwards in a very defective way. The whole aspect of the place is indicative of neglect and backward civilization. The site no doubt is a bad one, and unfavourable for drainage; but it could be drained. It is merely a matter of sanitary engineering. It can also be well paved and properly cleansed, and suitable conveniences provided. Were these improvements carried out the general health of the place would be materially improved. Notwithstanding the neighbouring sources of malaria, there is nothing in the surrounding country a tenth part so bad as the town itself, and it is here that the evil requires to be grappled with.

The supply of water from ancient springs in the vicinity is unlimited, but it requires to be laid on in connexion with drainage, to be of real benefit to the sanitary state of the town.

Such of the poorer class of houses as we saw are very miserable, the floors of stone, and damp, and the places dark and noisome, to a degree we have rarely seen elsewhere.

We visited the civil hospital, which may be taken as an illustration of the backward state of things in this town. Everywhere hospitals have generally been much in advance, in matters of health and convenience, of the houses of the poor from which they receive their inmates. Bad as these houses are at Amaxechi, we question whether any large proportion of them are in a much worse state than the hospital. It is a cottage looking building, dirty, uncomfortable, without ventilation, without any of the barest means or appliances for treating sick, if we except dirty beds. The only favourable thing about it was that there were only two or three patients in it. As to attendance or administration, there is none; for after knocking some time for admission, the only person we could find to admit us was a slip-shod dirty woman, who appeared to be in charge.

Notwithstanding this neglect, it was stated to us that a considerable sum of money is set apart every year by the Government for the support of the place.

In this as in other towns of these islands some authority is required competent to deal with all questions bearing on the public health, with power and means to improve the sanitary condition of the people.

4.—Diseases and Mortality among the Troops.

The mortality among troops serving at this station is given in the Statistical Report at 46 per 1,000 strength per annum for the 20 years from 1817 to 1836. Of this tropical mortality 37·6 per 1,000 was occasioned by various types of fever. Remittent fever is stated to have been the chief source of fever mortality, and to have attacked nearly a third part of the troops annually. In 1828, out of a force of 294, there died 33 men from remittent and 11 from continued fever passing into remittent, the fever mortality in that year amounting to 15 per cent. of the strength. In 1829 the disease again broke out and attacked nearly the entire garrison.

During the 10 years from 1837 to 1846, the average strength was 125, and the mortality was in the ratio of 19·9 per 1,000. The fever mortality was 13·5 per 1,000, chiefly from remittent fever, which in 1837 attacked nearly half the garrison.

A return for 10 years, between April 1st, 1850, and March 31st, 1860, prepared for us by the medical officer in charge. Appendix 13 gives the following results:—

Aggregate strength for the period - - - -	1,200
Admissions to hospital - - - - - - -	752
Deaths - - - - - - - - -	15

The average annual mortality for these 10 years was 12·5 per 1,000, and the admissions 625 per 1,000 strength. Of the 752 admissions 213 were from fevers, and of these 113 were intermittent, 30 remittent, and 65 continued fevers; there were also three cases of typhus. Of the 15 deaths two were occasioned by intermittent, four by remittent, two by continued, and two by typhus. The mortality from fevers was two thirds of the total mortality.

The Report of the Army Medical Department for 1859 states the strength for that year at 106, out of which there were 96 admissions to hospital and no deaths.

We learn from the returns prepared by Deputy Inspector-General Dr. Innes, that in 1860 the strength was 112, and the admissions to hospital 82, of which there were four from intermittent fever, two from common continued, and three from typhoid fever. There was only one death during the year and it arose from continued fever.

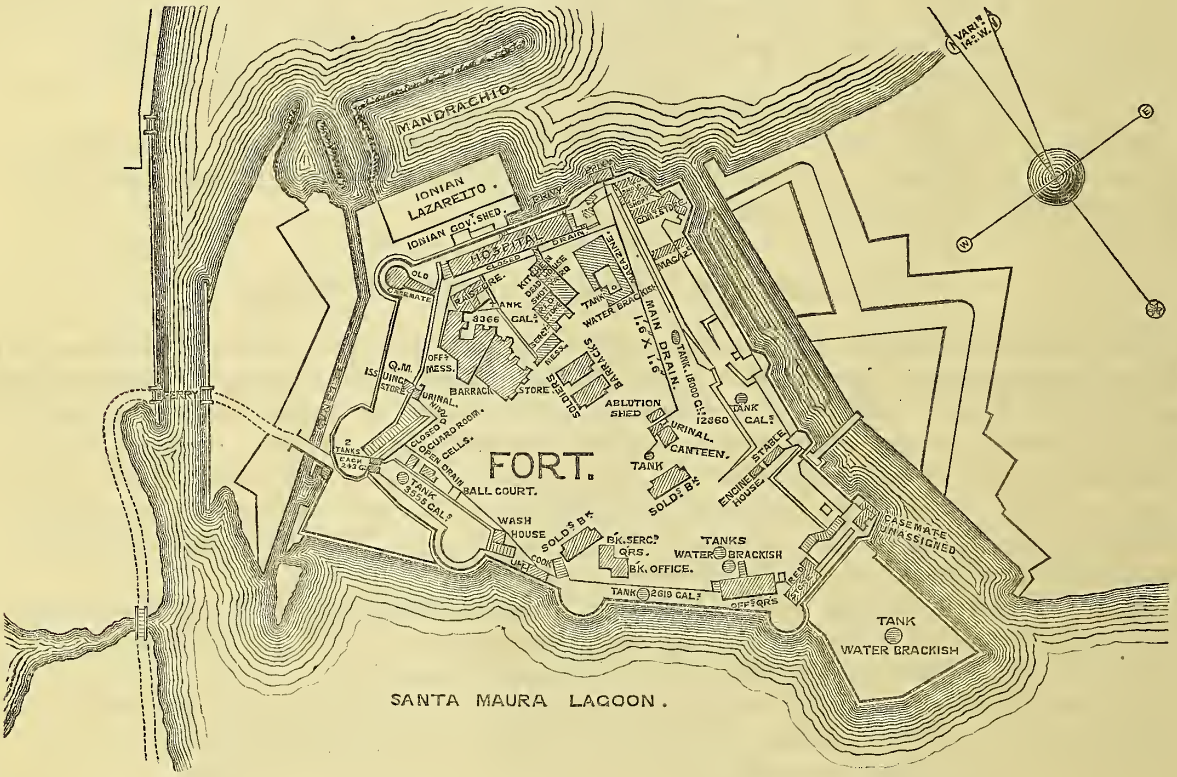
During the first three quarters of 1861 the strength averaged 120; there were 47 admissions, of which four were from intermittent, five from remittent, and one from continued fever. There was one death from tetanus. At the time of our visit there was not a single patient in hospital out of a strength of 132.

These statistics as a whole show a remarkable improvement of late years in the sanitary state of the garrison at Santa Maura; but they also show that fevers of the periodic type constitute the danger of this station, and that sanitary improvements should be mainly directed to removing any local predisposing causes of these diseases which may exist.

5. Sanitary State of the Fort and Barracks.

The Fort of Santa Maura, a plan of which is given in Fig. 30, is situated above a mile to the north-east of Amaxechi, and occupies nearly the whole surface of a triangular area of ground, converted into an island by ditches at the point of a spit of low marshy land running along the Greek coast. The island is about 1,100 feet long, and 800 feet wide at its broad end. The fort is triangular in form and consists of curtains with bastions. The area inside the barrack boundary is 22 acres 6 perches. The surface soil is gravel, and the subsoil is described as a species of natural concrete. The fort walls rise directly out of the water, and overtop all the buildings within. Very few of the ancient buildings remain, but among others is the church of Santa Maura, now used as a store. The officers' quarters and barracks are of recent construction, and the hospital appears to be an old building converted to its present purpose.

Figure 30.—Fort of Santa Maura.



On the north is the open sea; on the south and west the shallow water of the Lagoon five or six square miles in area; on the east side close under the fort wall on the spit there is some extent of broken marshy ground with vegetation, as there is also on the neighbouring coast of Greece. There is likewise considerable vegetation in the shallow water itself, close to the walls. The position cannot be said to be a healthy one, for the reasons already given, but it might be improved; at all events its disadvantages admit of being partially compensated for by improvements in other directions. Some improvements have been already made, and since their date there has been a marked diminution of disease and mortality. We allude to the destruction of the old barracks by an earthquake, the erection of the present barracks since 1836, and the great diminution of overcrowding consequent on the reduction of the garrison to less than one half, and of late years to one third of the numbers, which used to be crowded into the bad barracks of the first unhealthy period.

The present barrack accommodation is in five buildings, three of which were constructed in 1832 and two in 1836. These blocks are separated from each other, and face the north to obtain the benefit of the breeze coming from the open sea. They are in two floors; the lower stories built of stone and flagged, on the level of the ground; the upper stories are of wood, and brick noggin, and they have wooden floors. The lower floors are, with one exception, not occupied as barrack rooms, the men being placed on the upper floors, which are reached by verandahs and outside stairs. The ground floor rooms were chiefly used as married quarters. The rooms have windows on opposite sides and at the ends, admitting of free perflation of air when open.

There are six rooms at present used as barrack rooms, affording space by the present regulation for 126 men. The details are as follow:—

Rooms.	Regulation Number of Men per Room.	Dimensions of Rooms.			Cubic Feet per Man.	Superficial Feet per Man.	Number of Men at 600 Cubic Feet per Man.	Windows.		
		Length.	Width.	Height.				Number.	Height.	Width.
		ft. in.	ft. in.	ft. in.					ft. in.	ft. in.
W. Room No. 1 -	21	57 9	16 0	10 10	476	44	16	14	2 7	2 4
" " 2 -	21	57 6	15 0	8 4	345	41	12	10	3 8½	3 0
X. Room No. 1 -	21	57 6	16 0	11 1	485	43	16	14	2 7½	2 4
" " 2 -	21	57 6	15 0	7 6	308	41	10	10	3 2½	3 4
U. Room No. 1 -	21	60 6	18 3	11 6	604	52	21	16	3 3	2 3½
S. Room No. 1 -	21	60 6	18 3	11 6	604	52	21	16	3 3	2 3½
Total - -	126	—	—	—	—	—	96	—	—	—
Guard Room -	—	24 0	14 0	11 6	—	—	—	2 2	3 3 2 10	4 0
Prison Cells, 5 each - -	—	13 0	7 0	7 0	637	91	—	1	1 6	3 0

Overcrowding.—The comparatively small amount of surface and cubic space allowed in these barracks for two thirds of the troops, even under the diminished overcrowding of late years, consequent on the great reduction of the force, enables us to understand what must have been the condition of the garrison in the old barracks at a time when it suffered from remittent fever of a more fatal kind than that of the West Indies.

Assuming 600 cubic feet per man as our standard of accommodation, these barracks will hold 96 men and no more. This is not enough for health. There can be no safety for men sleeping on ground floors in such a locality. None but upper floors should be used as quarters, and if lower floors are to be used at all, it should only be as dining and day rooms.

All lower floors should be struck off the barrack accommodation, and if this were done, and 600 cubic feet per man allowed in the other rooms, the troops would be more healthy than they are now.

In low positions, such as that occupied by the fort, where sea water penetrates the subsoil, ground floors are always damp, and in malarious districts the poison is always more intense close to the ground than it is 10 or 12 feet above it.

The sanitary condition of the troops would be further improved by a larger allowance of surface area. In positions not naturally healthy, it is necessary to give more space for the men than they could do with in a more healthy position even close at hand. In the present case the surface area should not be less certainly than 60 to 70 square feet per man. This of course would imply more cubic space than the regulation amount of 600 feet per man.

Ventilation.—The window space is sufficient, and this, together with the isolated position of the barrack rooms, constitute the most favourable points of the construction. There are no fire-places, although the winters are cold and variable and the air damp.

There are no special means of ventilating the rooms.

Two louvres on Muir's principle are required for each of the upper floor rooms. They should be placed in the ridge. Two shafts are required for each of the lower floor rooms. Each room above and below should also have four louvred ventilators for inlets, two on either side close to the ceilings.

Each room should have one large-sized ventilating grate for warming the air in cold and damp weather.

Drainage.—As the surface of the ground within the fort is very slightly raised above the water, the levels are unfavourable for drainage. But unfavourable as they are, the levels are rendered more so by the method of drainage adopted. There is one large drain 18 inches square, commencing at the canteen, which, after traversing the works, has its outlet into the sea. Another closed drain proceeds from the officers' mess along the front of the hospital, and joins the main drain at right angles. As there is no flow of water through the drains they are simply nuisances on account of their size and form, and when the wind blows from the northern points foul air is driven into the barrack yard.

The other drainage is all on the suface.

The drainage requires to be examined and relaid. A few lines of 6-inch drain pipe should be laid with sufficient slope to the present outlet. The ground along the sides and ends of the barracks should be flagged and channelled; carefully laid flagged channels should convey the surface water to trapped gulleys in the branch drains, and the outlet should terminate by a drop under the surface of the water to prevent the wind blowing up the drain as at present.

The branch drains should receive the waste water of cook-houses, ablution rooms, urinals, &c.

Provision should be made for flushing out the drains occasionally.

Privies.—These are in a temporary wooden structure projecting about 8 feet from the north wall of the fort over the sea, and about 25 feet above its level. The place is entered by passing out at an embrasure. This arrangement is much better for health than any that could be devised within the fort, but the details might be improved to prevent accidents. There might be proper seats and divisions, and more light and ventilation from the roof.

Urinals.—These are within the barrack square, and are of the usual faulty construction. They are made of large flat porous stones. Slate or earthenware urinals, with water near at hand for cleansing, would be much better.

Water Supply.—Water is derived from three sources, wells, rain-water tanks, and importation.

Water is found at the depth of 8 feet below the surface of the barrack yard. Any water supply obtained in this way can only proceed from two sources, namely, from rainfall pent up within the walls of the fort, and from infiltration of sea water. The extent to which one or other element prevails in the wells will depend on the amount of rainfall, and on the amount drawn from the wells. The well water is of course brackish, unpleasant, and unwholesome. It is hard, and contains a large amount of carbonate of lime and sea salt. It is unfit for drinking or culinary purposes, but it can be used for washing, ablution, and bathing at a considerable cost of soap, and also for flushing drains, and for purposes of general cleanliness.

There are six tanks for storing rain water and imported water. They are of a limited capacity, only 42,351 gallons, or about 330 gallons per head of the troops.

The sum paid by the commissariat for water brought in boats, as shown by Appendix 11., was 9*l.* 3*s.* for the year 1856, but we believe it has been greater since.

The rain-water tanks are supplied from the drainage of the bastions, works, and roofs. More water could be obtained in this way provided all the roof drainage were collected and additional tank space provided. All this water should be filtered before passing into the tanks, and as regards new tankage, it would be very advisable to construct it above the level of the ground beyond the reach of sea water or surface impurities. Great care should be taken to keep the tanks clean. Nothing is so prejudicial to health in such climates and localities as impure drinking water.

This was well understood in the time of the Turkish possession, at which period an aqueduct 1,300 yards in length and of 260 arches was built from the island to the fort across the lagoon. This work, which also served as a bridge to connect the fort with the island was partially destroyed and the water supply cut off by an earthquake in 1825, and it has never been repaired. Its place could be supplied by a small metal pipe without much difficulty, and the old water supply restored.

Ablution and Bath Accommodation.—The ablution room consists of a wooden shed, with a stone floor, 30 feet long and 14 feet wide, having two stone benches for holding basins. Water is not laid on, and has to be carried from a pump. There is no bath. Two would be required for purposes of cleanliness, and as the well water which would have to be used is brackish, an allowance of soap would have to be made.

Cook-houses.—There are two cook-houses; one a miserable hovel for the artillery; the other is built against the wall of the fort. It has no ventilation. The floor is badly paved and dirty. The boilers are of the old construction, and it has a brick oven, which requires more wood to heat it than the men have at their disposal. Water has to be carried by hand from tanks at the entrance of the fort, 100 yards off. There is a small open drain leading from the cook-house to the ditch.

The cooking arrangements require great improvement. Steel boilers and a steel oven, should be provided; the floor should be re-laid; water provided nearer at hand; and the place should be ventilated. The artillery cook-house should be abandoned, one cook-house is quite sufficient for the garrison, if properly managed.

Women's Wash-house.—This is a building open in front. It has seven fire-places against its back wall, a boiler, and tables along the sides. It appears to be sufficient.

Married Quarters.—These are on ground floor rooms with flagged floors, and objectionable for reasons already stated. Nobody should sleep on the ground floor in such a situation. Married quarters are therefore required; they should have thorough ventilation, and should be on the same plan as those erected at Corfu.

The Officers' Quarters are the best portions of the buildings. They are all on upper floors, entered from verandahs. The lower floors are occupied by servants. The mess room is at the opposite end of the barrack yard, in a dark, gloomy old building.

Guard Room.—This is a small room, and the lock-up is quite insufficient. It is entered from a door outside, and is ventilated into the guard room. These defects require remedy.

The present cells, five in number, are ventilated.

Canteen.—The canteen is a large, dark, damp room, with a bar and a division partitioned off for non-commissioned officers. It is the only place, however, to which the men can resort when out of barracks. There is no day room nor other place for amusement.

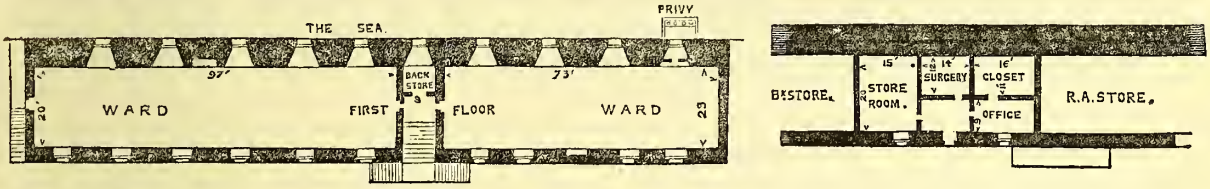
Stations such as this require reading and recreation rooms, with books, newspapers, games, &c. to give the men something to do. There is a great want of these necessaries at present.

6.—Hospital, Santa Maura.

This building consists of two floors, the upper one only being used for sick. It is of old construction, and the thick north wall of the fort forms its northern side. There are 10 embrasures, with glass windows in the length of the building, which, when opened, allow of free ingress for the cool northern sea breeze. There are 10 windows in the opposite wall. On the ground floor, underneath the wards, are the surgery, stores, office, and an artillery store. The pack store is up-stairs at the top of the landing, and occupies space very much required for other purposes. It is a very small room, but might be enlarged and made sufficient for an orderly's room. At present there is nobody in the building with the sick, unless in the wards, simply because there is nothing except wards.

Fig. 31 shows the arrangements of this hospital.

Figure 31.—Plan, Ground Floor and Wards of Hospital, Sta. Maura.



The following is the accommodation:—

Wards.	Regulation Number of Beds.	Dimensions of Wards.			Cubic Feet per Bed.	Superficial Area per Bed.	Windows.		
		Length.	Breadth.	Height.			Number.	Height.	Width.
		ft.	ft.	ft.				ft. in.	ft. in.
East -	20	97	20	12	1,164	97	3 4	5 0 3 2	3 1 3 2
West -	15	73	23	10	1,119	112	6 4	3 2 4 6	2 11 2 2

With the following exceptions, the accommodation is good of its kind; and there is not likely to be any overcrowding, on account of the improved health of the garrison. At the time we were there not a single bed was occupied. One ward was temporarily used as a reading room for want of other accommodation.

Ventilation.—There is none, except what depends on the casual opening of windows. Each ward requires two louvred turrets in the ridge on Muir's principle, and also inlets for fresh air along the eaves. There is a fireplace for warming the wards. It should be provided with a ventilating fire grate of the new pattern.

Drainage.—Similar to that already described, and requiring to be similarly improved. The roof water all sinks into the subsoil. It should be collected for use.

The Privy is of the same construction as the barrack privy. It is entered through a loophole at the end of the east ward, and there is a ventilated lobby between the privy and the ward. The whole projects beyond the fort wall, and is 25 feet above the water. No doubt the arrangement has certain inconveniences for sick, but it is the best under the circumstances, and quite free from nuisance.

Water Supply.—Water for the sick has to be carried in boats from the town. The same remarks apply to this subject as to the water supply of the barracks generally.

Lavatory and Bath Accommodation.—None. A shower and hip bath were standing in one of the wards.

A small space, properly lighted and ventilated, could be found at the end of the wards to hold a single bath and an ablution table, with sunk basins, and water laid on. There is plenty of room.

Kitchen.—This is a small building opposite the hospital, a few yards distant. Next it is the dead-house, used as a wood store and meat store. Means of cooking deficient; and the only change of diet for the sick is from boiling to frying. A small range with an oven is required.

Attendance.—The hospital serjeant has a room, not in the hospital, but the orderlies have no accommodation.

It would be very advisable to provide a room for the orderly on duty at the top of the stair between the wards, with a small inspection window into each ward. The bath and ablution room should also be between the wards. The pack store should be removed, and the space it occupies turned to one of these purposes.

Convalescents.—There is a small garden used for exercise, but it has no shade, and the cool north winds are cut off from it by lofty walls.

We may sum up the sanitary improvements required for this station as follows ;—

1. Abandoning all lower floors as sleeping rooms, and devoting them for recreation rooms, stores, &c.
2. Diminution of overcrowding, by affording the men at least 600 cubic feet per man on the upper floors. And constructing additional accommodation to enable this to be done.
3. Ventilation, by ridge louvres and inlets, of all the barrack rooms and hospital wards. Ventilation of the ground-floor rooms by shafts and inlets.
4. Improved surface and deep drainage.
5. Extended water supply. Water to be laid on to ablution room, and a bath with water to be provided. Ablution room and bath required for hospital.
6. Better cooking apparatus to be provided for barracks and hospital. Cook-houses to be improved as suggested.
7. Orderlies' accommodation to be provided in the hospital.

IV.—ITHACA.

1.—Topography and Climate.

This island is situated about 12 miles from the south-east point of Santa Maura, and lies between the mainland of Greece and the island of Cephalonia, from which it is separated by a narrow channel.

Ithaca itself is about 16 miles in length; its greatest breadth is 5 miles, but its outline is so irregular that the surface only contains about 44 square miles. About midway in its length the island is almost cut across by the Gulf of Molo, the two ends of the island being united at this point by a lofty mountain ridge little more than half a mile broad. The whole island is simply a mountain mass, 1,500 or more feet in height, extending from south to north, with the two ends curved a little to the east. There are a few lateral spurs sent off by the central chain with valleys between them, but there is very little level surface anywhere. Generally, the coast dips at a high angle into the sea, or it is precipitous. The rock is principally limestone, covered on the steep slopes with thin soil and scanty herbage; but there is more fertile land and greater elements of prosperity in the island than it has received credit for.

The chief town, Vathi, where the garrison is situated, occupies a site of singular beauty, at the head of an inner bay, branching at right angles from the Gulf of Molo. Neither town nor bay are visible from the sea, and it is only after sailing half-way up the gulf that both suddenly come into view. From the land the town appears to be situated on an inland lake inclosed among mountains. A quay runs along the margin of the water, and the barracks are situated at the end of the quay nearest the sea.

There are neither lakes nor marshes in the island, and the usual sources to which malaria is attributed are hence absent; but at the foot of many mountain slopes are masses of débris, receiving the water from the higher levels, keeping the subsoil in a constantly damp state, and exposing the inhabitants of all houses built on it to malaria.

The ground about Vathi partakes of this character, but it could be improved by thorough drainage and by cutting off the water of the upper slopes by means of an intercepting drain from the ground on which the houses are built.

The lower part of the town is close on the sea level, the foundations being at or below that level; hence salt water flows into the loose subsoil under a portion of the houses. The topographical position of the town would in such a climate indicate the presence of malaria apart from marshy ground; but with proper drainage and other sanitary measures this evil could be very greatly diminished if not entirely removed.

Climate.—There are no instruments at the station, except a common thermometer, the mean temperatures obtained by which for two years are given in the Appendix. These show a climate remarkably temperate and equable. The lowest monthly mean in winter is 53° F.; the highest monthly mean in summer is 84°, and the greatest daily variation does not exceed a degree or two.

As regards health the climate is said to be very good; the air dry and pure; no fog or damp except during the sirocco. This is somewhat debilitating for feeble constitutions, or for persons with latent disease, but the climate is otherwise agreeable, and not detrimental to health.

2.—Diseases of Native Population.

We have no statistical data to show the nature of the local diseases. We have been informed that during the winter months catarrh, influenza, and intermittent fever prevail more or less among the native population; but it is stated that in many cases the fever is contracted on the Danube, where many of the male population spend nine months of every year. Other cases of fever are said to occur mostly among the people who live on ground floors, a tolerably certain indication of the sources of local malaria. Spleen and mesenteric disease are also common.

3.—Mortality and Diseases among the Troops.

The force in barracks at Vathi has been very small. For the 20 years preceding 1837 it averaged only 65 men; but, small as the force was during these years, it yielded a mortality of 26·1 per 1,000 per annum. Of this mortality 10·7 per 1,000 was due to fevers.

Out of 14 fever deaths, 11 were caused by remittent, two by intermittent, and one by common continued fever. This fact is sufficient to show the important influence which local malaria then exercised on the health of the troops. In some years more than half the garrison was attacked by malarial diseases. Diseases of the lungs, consumption, hæmoptysis, pneumonia, and catarrh occasioned a mortality of 9 per 1,000 strength, nearly half of which was due to consumption.

The returns for the next 10 years, given in the statistical reports (1837-46), show an improved state of health. The average strength during the period was 57, and the annual ratio of mortality was 21 per 1,000. Fevers and diseases of the chest were still the chief causes of death. The former class occasioned a loss of 11·8 per 1,000, more than half of which was due to remittent, and the rest to continued fever. The mortality from chest diseases was due to consumption and pneumonia.

A return made for us by the medical officer in charge, Appendix 15, including a period of seven years ending December 1859, gives the average strength at 54 men, and the average admissions to hospital at 760 per 1,000 per annum. Of this ratio of admissions 147 per 1,000 was due to fevers, less than one-half being due to intermittent, and the remainder to continued and remittent fevers, chiefly the former. There was only one death during the seven years, and that from neither fever nor pulmonary disease.

The year 1860 was a healthy year. The strength was 49 men, of whom there were 28 admissions to hospital, three only being from fever of the continued type. There were no deaths.

During the first three quarters of 1861 the average strength was 60, and there were 43 admissions to hospital, only three of which were from continued fever. There was one death from chronic bronchitis.

The continuous improvement in the health of the troops at this station indicates improved sanitary conditions in the locality and in the general management of the troops. Local malaria, nevertheless, has to be guarded against in Ithaca, as elsewhere in these islands; and there is quite enough about the barracks and hospital to call it into activity whenever unusual moisture with heat occurs.

This liability to malaria is partly due to lowness of position, partly to the water from the hills gravitating towards the site of the town and barrack, and partly to the bad sanitary state of the town itself.

4.—Sanitary Condition of the Barracks.

The barracks are situated close on the edge of the bay, at the foot of a slope descending from a mountain which rises at a short distance behind them to a height of about 1,500 feet. They are away from the mass of the civil population, at the end of the town nearest the entrance of the bay.

A stone quay is carried along the edge of the water, in front of the barracks and houses, forming a good street, and adding materially to the healthiness of the locality, by ensuring a certain depth of water along the shore and preventing the deposit of putrescing substances close to the houses. The great depth of water in the harbour is also another element of health of no small importance, by the rapid dilution and disappearance of impurities which it ensures.

There are no sources of malaria along the foreshore near the barracks. The elements of malaria must be sought for at the base of the declivities and in the comparatively level ground on which the strip of houses is built. This ground is formed of débris resting on the limestone rock at the water level and above it. It is saturated with mixed salt and fresh water, the former from the bay, the latter from the mountains above. This is proved by the state of the wells, which yield brackish water.

The ground, moreover, appears to be charged with organic matter from bad surface cleansing and want of drainage. Notwithstanding the ready outlet to the bay, we saw foul stagnant water and filth resting in badly-constructed gutters among the houses, and the soil looked black and saturated with foul matter.

The ground within the hospital enclosure is in this state. It has no drainage except by a foul surface drain close under the ward windows. The privy is over a cesspit not 20 feet from the well, and the contents of the cesspit are buried from time to time in the soil of the small garden in which it is situated.

With such a condition of the subsoil, the production of malaria of a very intense character is inevitable, whenever the conditions favouring its production come round.

This beautiful and interesting island ought to be healthy. It is popularly considered as inevitably the seat of malaria; but it requires a very slight examination to show that malaria in this as in many similar cases is simply a home manufacture.

This observation, although specially referring to the district where the barracks are situated, is more applicable to the town itself. Vathi, like all the Ionian towns, requires good drainage combined with water supply, good paving, and a proper system of cleansing and general sanitary police, to give it the full benefit of its beautiful natural position.

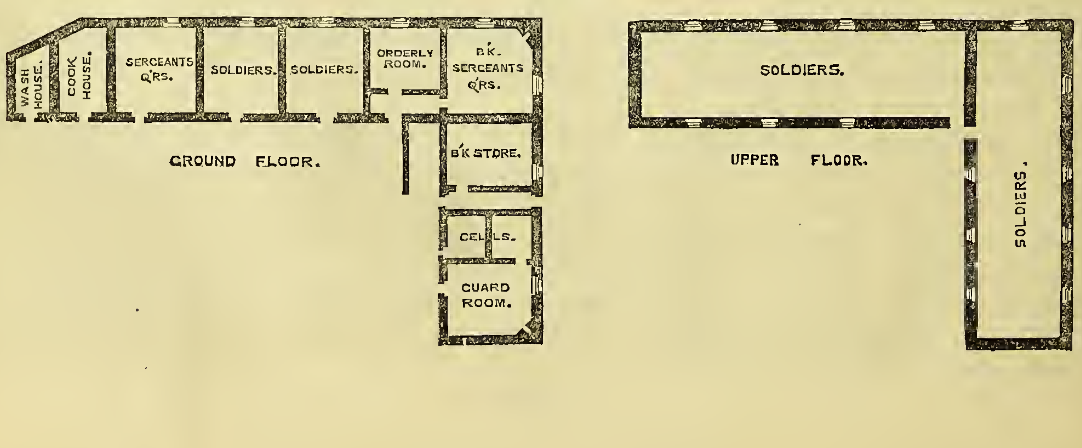
The barracks are situated within an oblong area of ground of 780 square yards, on a subsoil consisting of gravel and débris resting at a certain depth on rock. The foundations are at the water level, and the means of drainage not very good. The buildings are in two floors, and they are bent at right angles to form two sides of a small square, the remaining sides being formed by the boundary wall.

The ground floor is divided into a number of small apartments containing serjeants' quarters, kitchen, store, guard room, cells, and we are sorry to say two of these ground floor rooms are allotted as barrack rooms for 12 men. The apartments are boarded, and have openings for ventilation under the floors on one side. Opposite openings to allow of a thorough draft under the floors are required.

The whole of the upper floor is divided into two rooms, one on each side of the angle. They are reached by an outside stair in the corner.

A plan of the two floors of this barrack is given in Fig. 32.

Figure 32.—Plan of Barracks, Ithaca.



There is regulation space in the barrack for 92 non-commissioned officers and men, as follows:—

Rooms.	Regulation Number of Men per Room.	Dimensions of Rooms.			Cubic Feet per Man.	Superficial Feet per Man.	Accommodation at 600 Cubic Feet per Man.	Windows.		
		Length.	Breadth.	Height.				Number.	Height.	Width.
		ft.	ft.	ft. in.					ft. in.	ft. in.
1	40	70	18	10 6	330	31	22	7	4 6	2 9
2	40	70	18	10 6	330	31	22	7	4 6	2 9
3	6	16	18	11 0	528	48	5	1	4 6	2 9
4	6	16	18	11 0	528	48	5	1	4 6	2 9
Total - -	92	—	—	—	—	—	54	—	—	—
Guard Room -	—	15	18	11 0	—	—	—	1	4 6	2 9
Cells, 2 - -	—	9	8½	11 0	—	—	—	—	—	—

Overcrowding.—These rooms can only accommodate 54 men at 600 cubic feet, but the two lower rooms are quite unsuited for barrack rooms. One of them has been turned from its purpose as a serjeant's quarter for one man, into a barrack room for six men. Both should be struck off the construction, and the occupation of the barrack reduced to 44 men at the outside, in the first-floor rooms.

Ventilation.—Insufficient. Each of the upper rooms has ventilating shafts in the ridge, but each requires four inlets for air, two on each of the opposite sides of the rooms close to the eaves. The lower rooms all require inlets of the same kind close to the ceiling, one on each of the opposite sides.

Drainage.—As the barrack yard lies close to the level of the sea, and at the foot of the watershed, it is imperfectly drained, and the surface was in parts wet when we were there. There is a drain running the whole length of the ground, which enters the sea after passing under both the prison cells. A branch drain from a gully runs across the upper end of the ground to this longitudinal drain. The lower end of the ground, between the barracks and the boundary wall, is not drained, and indeed the arrangement of the walls and buildings is unfavourable to good natural drainage. Within this area a shallow well has been dug, the use of which, so far as we could learn, was to supply water for flushing the privies. It is situated at the lowest point of the enclosure, and within a few yards of the sea.

There were at the time three feet in depth of water in this well, salt and fresh water mixed, which together with the organic matter finding access to the well, enters into decomposition, and produces great nuisance in warm weather. This contrivance should of course be filled up and abolished; the result of its formation has, however, afforded an interesting practical illustration of the manner in which foul air is generated in the subsoil of such localities.

Latrines.—These have recently been removed from the higher end of the ground to the lowest point, against the boundary wall, and they are drained by a barrel drain 25 feet long into the bay. The latrines are merely an open trough, into which water for cleansing is thrown by hand. They are most offensive, and their construction is very defective.

They require to be replaced by Macfarlane's or Jennings' latrines, and to be properly supplied with water. There would be no difficulty in doing this by means of a pump for throwing water into a raised cistern from which the water could be drawn for supplying the latrines.

There is a urinal at the upper end of the ground, of bad construction and offensive. It should be replaced by a better form, of iron or slate urinal, and provided with water for cleansing.

As regards the general drainage of the barrack. The present large old drain should be abolished, and the whole of the ground should be tile-drained as deep below the surface as the levels will admit. A small pipe drain should be laid to convey away all waste water from kitchens, lavatory, urinal, &c. The drainage should be carried free of every building in its way to the sea.

Water Supply.—There is a well of brackish water within the barrack enclosure, unfit for drinking or for culinary purposes. It could be used for the latrines and similar purposes if a tank to be filled by a pump were placed at a sufficient elevation, and the water conveyed by pipes at pressure.

All other water has to be carried from a public well at a short distance above and behind the barracks, supplied by a spring in the débris at the lower end of one of the ravines.

The total quantity of water carried for the use of the troops in 1856 (the year for which we have received the return, Appendix 11,) was 46,746 gallons, at a cost of 13*l.* 10*s.* 4*d.* This would give less than 2⅓ gallons per man per day for a strength of 54 men, at a cost of 5*s.* per man per annum. That is, there was paid for this very stinted supply, as high a water rate for each man as a working man in England pays under the Public Health Act for an unlimited supply for his family.

It has been proposed to lay on water from the public well to the barrack, but we believe the local authorities have objected to it. The only reasonable ground for the objection must be the fear of diverting the water from public use; but this could easily be overcome. The spring is constantly flowing, but is only wanted for public use during the day. If a tank capable of holding 2,000 gallons were erected at the higher part of the barrack boundary, a small part of the night supply would keep it full, and an arrangement might possibly be made to this effect with the municipal authorities. The water should be laid on for all purposes; and were this done it would not be necessary to use the brackish well water for any purpose.

Ablution and Bath Accommodation.—This is a mere lean-to shed, supported on pillars, having a stone bench and the usual moveable basins. There is a small tank beside it, from which water is obtained. There are no baths. One should be provided, and the ablution accommodation should be improved and drained. If the water supply were increased water should be laid on to the bath and to the ablution table. Otherwise the brackish well water could be used for the bath if marine soap were issued.

Cook-house.—The cook-house and women's wash-house occupy a small one-storey building at one end of the barracks. The cook-house has square boilers and a brick oven. It requires roof ventilation. Water is not laid on, but has to be carried from the tank. Refuse water runs away in an open surface drain into the main drain, and so to the sea. The new steel boilers should be substituted for the present boilers, and water for cooking should be laid on to a proper sink.

Women's Wash-house.—This is a small shed building, with two fireplaces, but without any other conveniences. It requires fittings and roof ventilation.

Guard Room and Cells.—The guard room has a stone floor, and has no ventilation. It should have inlets for fresh air on the two opposite sides close to the ceiling. The cells are bad, and have a drain passing under both of them. One of them is entered from the guard room, and the other from the outside. One is used as a meat store. Either of the cells is a very likely place for a tipsy man to get fever in, and therefore one or two new cells should be constructed.

There are no means of recreation except a skittle shed. There is no reading or day room, no serjeants' mess, and not even a canteen.

The strength at this station should either be reduced to give sufficient space for the men or the barrack accommodation should be extended to provide space, means of recreation, and conveniences required by the garrison.

5.—Hospital, Vathi.

This is a mere apology for a hospital. It consists of the upper floor of a private house, situated in a narrow filthy lane, about 200 yards from the barracks, and by no means in so good a situation as the barracks occupy.

The ground floor of the house is occupied by a Greek, who lets the upper part; and there is only a thin wooden floor between the family living room and the sick ward above.

The room used for patients is 27 feet 9 inches long, 23 feet 8 inches wide, and 9 feet 5 inches high, and is supposed to have space for six beds at 1,030 cubic feet per bed. There are three small low windows along one side, and one similar window opposite. The hospital serjeant's quarter and surgery are on the same floor; also a small apartment used as a kitchen. There is a damp store room below. There are no conveniences of any kind. The privy is in the back yard or garden, and is connected with a cesspit. Water is thrown down the privy into the cesspit, and the porous soil takes up as much of it as it can. Any solid matter is taken out four times a year and buried in the garden. There is a well in the garden about 20 feet from the cesspit. A very foul surface drain runs down the garden and under the doorway into the street, and the whole surface of the ground when we saw it was filthy.

A small hospital for half a dozen beds, with the most needful conveniences, is absolutely necessary; it would be a mere waste of money to endeavour to make the present room suitable for sick.

V.—CEPHALONIA.

1.—Topography and Climate.

Cephalonia, the largest of the Ionian Islands, lies across the entrance to the gulf of Corinth, at a distance of about 21 miles from the nearest point of the Greek coast. The island is about 31 miles long by 25 miles broad at its widest part. It is very irregular in form, and is deeply indented by an arm of the sea on its southern side. It consists of lofty mountains rising to the height of from 3,000 to 4,500 feet above the sea, the highest of which, called the Black Mountain, a few miles to the east of the military station, is covered with snow in winter. The southern end of the island is considerably raised above the level of the sea, and the ground slopes from the highest point towards the gulf of Argostoli, on the shores of which the barracks are situated. The base of the island is limestone, with which are associated several other formations, and there are abundant evidences of the action of subterranean forces. One of the anomalous appearances presented by the shore at a short distance from the barracks, is the sea running into the land by channels cut for the purpose and driving mills in its course.

The part of the island with which we are more immediately concerned is the district around Argostoli, the capital, and also that in the vicinity of Luxuri, on the opposite side of the gulf. Commercial purposes, in this as in other districts of these islands, have led to the towns being placed in the lowest and most unhealthy spots to be found, thereby reversing the principles on which sites for ancient cities were chosen. In all directions round Argostoli there are plenty of sites for towns, and within view are the ruins of one of the ancient cities, on a hill, several hundreds of feet above the sea; while the ground on which the present capital is built is the lowest obtainable. It receives the drainage from a large tract of higher country to the south and east, and close to the eastern end of the town is a salt marsh, half a square mile in area. This marsh has long been a cause of serious periodic fevers, affecting the inhabitants of the eastern extremity of the town, but, thanks to more enlightened views on the subject, it is now being filled up; a measure which will improve materially the health of the community, and at the same time reclaim much valuable land.

Argostoli contains about 10,000 inhabitants, and is by far the best laid-out town in the Ionian Islands. The western end of it consists of spacious open streets, formed of a class of houses much superior to those in other Ionian towns; and there is a more general appearance of industry, cleanliness, and comfort among the people.

But under the surface there is the same want of sanitary works as exists elsewhere. Much of the area covered by the town is little, if at all, raised above the level of the water; and there are abundant evidences of absence of proper drainage and strict sanitary supervision.

Here, as elsewhere, the aid of the sanitary engineer is required to introduce combined works of drainage and water supply, and to improve the paving and surface drainage.

Luxuri is in a much worse condition than Argostoli. It has no drainage except by foul open gutters, the paving is bad, and the whole town is in a very filthy state. It requires great improvement to make it healthy.

Climate.—We have received no account of the climate, except the general statement that it resembles the other climates in these islands, with greater variability on account of its lofty mountains. The air is said to be pure, except during the sirocco, when the climate is stated to be most oppressive and debilitating.

The winter months are considered the most healthy, the autumn months are the most unhealthy. Severe fevers and bowel complaints then prevail.

2.—Mortality and Diseases among the Troops.

The report on sickness and mortality in the army (1839) gives the following information on this subject, for 20 years preceding 1837. During this period the average strength in garrison was 374, and the average annual mortality was 30·5 per 1,000. Of this death-rate 15·6 per 1,000 was due to fevers, and 6 per 1,000 to chest diseases. Nearly three-fourths of the fever mortality were due to remittent, and about one-fourth to continued fever. About two-thirds of the deaths from chest complaints were attributable to consumptive diseases.

During the succeeding 10 years, 1837–1846, the average strength was 360, and the mortality was only 15 per 1,000 per annum. In one year only of this period did the death-rate reach the same standard at which it had been for the entire 20 years preceding 1837. Chest diseases, mostly consumption, occasioned a mortality of 5·3 per 1,000, but the fever mortality had fallen to 3·6 per 1,000. Remittent and intermittent occasioned seven-twelfths of the fever deaths; the remainder were due to continued fever.

During the 10 years 1850 to 1860 (Appendix 16) the average strength at the station was 603 men, among whom the admissions to hospital averaged 882 per annum, or at the rate of 1,462 admissions per 1,000. Of these annual admissions 61 were from intermittent, 45 from remittent, and no less than 220 from continued fever, showing that out of every eight cases received into hospital three were fever cases. The mortality during the same period, including 27 deaths from cholera, was in the ratio of 21·9 per 1,000 per annum. Nearly 42 per cent of the mortality was due to fever, half of it from the remittent and half of it from the continued type.

In 1860 there were 93 cases of remittent fever at Cephalonia during the first nine months of the year, out of a strength of about 520; and in 1861, during the same nine months, out of a strength of 542, there were no fewer than 257 cases of continued, and eight of remittent fever, received into hospital. There were two deaths during the two periods, but not from fever. The outbreak of continued fever at Cephalonia was simultaneous with a similar outbreak, but a fatal one, at Corfu.

The most important diseases at Cephalonia do not differ from those at the other islands, and their local causes are the same.

3.—Sanitary condition of Argostoli Barracks.

There are four principal barracks in the islands: three of them, known as the Lazaretto, Mescopulo, and New barracks, are at the west end of the town of Argostoli; and the other is at Fort St. George, on the summit of a lofty hill seven miles to the east.

The town barracks are all close together, and are built on the slope of a hill falling rapidly to the level of the bay. Their position is shown in the Plan No. XXXV.

Mescopulo barrack is the highest up, and is between 140 and 150 yards from the water. Immediately below, and enclosed within high walls, are the Lazaretto buildings, used as a barrack. The New barrack is a little lower down than the Mescopulo barrack, and about 150 yards to the east of it. All the buildings are either on steep sloping ground or immediately at the foot of the slope.

There is a large water shed above and behind them, and they are all built right across the downfall of the natural drainage. Towards the bay there is little to complain of, except that the site of the Lazaretto barrack is too near its level; but towards the land the position is a very bad one. The lofty hills behind consist of fissured limestone, with red earth and débris. The slopes are occupied by numerous olive trees and by other vegetation. Much reflected heat is thrown from the bare rock wherever it is exposed to the sun; and as no means have been adopted for cutting off the drainage of the hills from the ground occupied by barracks, the position occasions damp in the lower floors of the barracks, and is in all respects a very likely one to subject its occupants to malaria; but the new north barrack is not so exposed to this disadvantage as the other two.

Besides these defects in position, none of the buildings are of such a nature as to render their use desirable for barrack accommodation. Two of them are hired houses, and the other is a lazaretto, belonging to the Government, repaired and partially rebuilt in 1834. None of them when constructed were intended for occupation by a number of men, and they are not suitable for it in such a climate.

The hired houses are kept in repair by their proprietors, and Government rents them. The result of so very objectionable an arrangement is, that repairs are not executed without much difficulty, and that the alterations and additions required to turn the buildings into healthy barracks unless executed at Government expense would, in all probability, never be undertaken; and after all was done the sites would be as bad as ever.

There is no question that the best thing to do, and the cheapest in the end, would be to build a healthy barrack on a well-selected and healthy site, and to give up the present premises altogether.

Although all the buildings constitute one occupation, and have certain things in common, we shall describe each of them briefly, and point out the sanitary defects in each.

1.—*Lazaretto Barrack.*

This barrack is placed close on the edge of the bay, and at the foot of the slope. It is separated from Mescopulo barrack by a public road which skirts its south-west wall. The ground along the road is above the level of the barrack yard, and there are two ranges of soldiers' quarters, one with its side the other with its end to the road, and separated from the road only by the wall. These rooms have their floors below the level of the road. In one of the rooms referred to, all the beds along one side are below the level of the ground outside, and the men sleep with their heads to the section of the ground, having only the wall intervening. No attempt has been made to cut off the hill drainage; on the contrary, the wall alluded to is built right across the natural outfall of the drainage. The locality is about the last that ought to be chosen for barrack accommodation; otherwise, the room is one of the best at the station.

The buildings generally are arranged in the form of a square, having soldiers' quarters on three sides, and the quartermaster's store, &c. on the other side. On one of the sides there are two blocks containing quarters, with a passage between them. Three of the blocks are two floors in height, and have the men's rooms on the upper floors. The other block is the one already alluded to as lying below the level of the road. It contains only a ground-floor room, which for the reason assigned above used to be very unhealthy, although it has been recently much improved in this respect by having roof ventilation provided. But the room will never be fit for permanent occupation unless the earth be cut away from its back wall, and an area be left between the wall and the earth to prevent damp.

The lower floors of the other blocks are divided into compartments for married quarters by partitions about 8 feet high, so arranged as to give each division the whole or part of a window.

The lower-floor rooms stand on the construction as men's barrack rooms, a purpose for which they are utterly unfit, although at the time of our inspection they were not so occupied.

The upper-floor barrack rooms have windows on opposite sides; but they are casements with shutters, having only a small pane of glass in the upper part of the shutter. The windows are small and low for the size of the rooms. None of the rooms have proper iron fittings, only hanging wooden shelves in the middle of the rooms, obstructing the ventilation.

There are no ceilings, only open roofs, through which the sun heat radiates strongly in summer. There are no fireplaces. A room occupied by artillery is small and dark.

The occupation of this barrack varies considerably.

In the following table we have given the number per room, obtained from two separate sources, as it existed in 1859, and in April 1860:—

Rooms.	Number of Men per Room.		Dimensions of Rooms.			Cubic Feet per Man, 1860.	Superficial Feet per Man, 1860.	Windows.		
	1859.	1860.	Length.	Breadth.	Height.			Number.	Height.	Width.
Upper Floor.			ft. in.	ft. in.	ft. in.				ft. in.	ft. in.
No. 1 - -	38	31	66 0	23 0	13 11	681	49	7 each room	5 8	4
6 - -	38	31	66 0	23 0	13 11	681	49			
11 - -	38	31	66 0	23 0	13 8	669	49			
15 - -	38	31	66 0	23 0	13 8	669	49			
Lower Floor.										
No. 2 - -	16	10	32 0	23 0	11 2	821	73	3 each room	5 0	4
3 - -	16	10	32 0	23 0	10 8	800	73			
4 - -	16	10	32 0	23 0	10 8	800	73			
5 - -	16	10	32 0	23 0	9 5	693	73			
7 - -	25	13	40 0	21 0	14 10	690	46	each room 4	5 0	4
8 - -	25	18	40 0	21 0	14 10	690	46			
9 - -	25	18	40 0	21 0	14 10	690	46	4	2 6	2
10 - -	15	10	32 0	23 0	10 6	772	73	3 each room	5 0	4
12 - -	16	10	32 0	23 0	10 6	772	73			
13 - -	16	10	32 0	23 0	10 6	772	73			
14 - -	16	10	32 0	23 0	10 6	772	73			
Royal Artillery.										
No. 16 - -	9	9	24 0	15 0	12 0	800	40	—	—	—
17 - -	1	4	15 0	12 0	11 4	510	45	1	4	3
18 - -	—	18	25 0	22 0	12 0	355	30	3	4	3
Total - -	364	289	—	—	—	—	—	—	—	—
Guard Room -	—	9	16 4	13 4	13 6	325	24	—	—	—
Cells - -	—	1	13 0	7 0	9 0	819	91	—	—	—

Overcrowding.—The number of men a barrack ought to contain, with due regard to health, depends on its local position, construction, &c. The question as to the present barrack is not whether the amount of space per man is sufficient for health, but whether there should be any men in it at all. If ever there were 364 men in the Lazaretto barrack there need be no wonder at the occurrence of fever. It is only what should have happened. To judge of the state of the barrack only from the space per man shown in the table would be fallacious, for there are rooms unfit for occupation, and which cannot be rendered fit.

The ground-floor rooms 2, 3, 4, 5, 10, 12, 13, 14, should be struck off the construction altogether. No. 18 has twice the number of men it ought to hold. Nos. 7, 8, and 9, as occupied in 1860, gave only 46 square feet per man, and were much overcrowded, notwithstanding their large cubic space, in which is included the open roof. There is considerable surface overcrowding in the upper-floor rooms; and if a third of the men were removed out of them and out of Nos. 7, 8, 9, the superficial area for the remainder would not by any means be excessive. These upper rooms, Nos. 1, 6, 11, and 15, are, however, the least exposed to malaria, and with plenty of ventilation would be the healthiest in the place for their cubic contents. It would make them cooler and more comfortable to line and plaster the roofs.

These reductions would have the following effect on the barrack accommodation:—

The eight ground-floor rooms 2 to 14, which have hitherto held from 80 to 127 men would cease to be occupied; No. 18 would hold 9 men; Nos. 7, 8, 9, which have been hitherto occupied by from 54 to 75 men would hold 12 men each, 36 in all; Nos. 1, 6, 11, 15, hitherto occupied by from 124 to 152 men would hold 21 men each, or 84 in all; No. 16 would hold 6 men instead of 9; and No. 17, 3 men instead of 4.

The Lazaretto barrack would thus accommodate 165 men and no more.

If this barrack must be occupied we would propose to fix this number as the limit of the accommodation.

Ventilation.—The rooms immediately under the roofs have ridge ventilation, but they have no inlets for fresh air along the sides. Four inlets are required along each side of each room under the eaves.

All the ground-floor rooms require ventilation by shafts carried above the roof and by inlets along the sides.

Drainage.—The drainage of the barrack square is all on the surface, and is in a bad condition, from want of proper guttering. Boulders are used for this purpose, and they are always unsuitable. Guttering cut out of flagstone, properly laid, is the best kind of surface drain for the situation. All refuse water is conveyed, partly by surface, partly by underground drains, to the sea in front.

Latrines.—There are two of these, one at each end of the barrack enclosure, and close to the sea. One appears to be connected with a cesspit; at all events, there is a cesspit beside it; and the other is over a small drain, into which the sea washes. This latter is accessible to all the troops in the three barracks. There is no current to carry off the soil, which creates great nuisance in consequence. The construction is otherwise bad. Macfarlane's or Jennings' latrines, properly supplied with water pumped up from the sea, should be introduced, instead of the present arrangement; and the iron pipe of the latrine should be carried into deep water at a sufficient distance to insure the soil being diluted in deep water and removed.

The urinal beside this latrine should be reconstructed of non-porous material and kept clean.

The cesspit beside the other latrine should be abolished.

Water Supply.—The only source of water for these barracks is rainfall collected from the roofs of three of the ranges of building, and stored in a tank capable of containing 62,855 gallons, constructed under the middle of the barrack square, and from which the water is raised for use by a pump. The quality is described as generally good, but the amount of tankage is stated to be only sufficient for eight months of the year. This must mean that it is sufficient for eight months of the year only because of the large amount which has to be carried every month in the year for the use of the troops. In 1856 there were brought into the three barracks 752,966 gallons, or 12 times the amount of the tank capacity in the Lazaretto, at a cost of 80*l.* 11*s.* 8*d.* to the commissariat. It would be worth while to inquire whether an unlimited supply might not be procurable on the hills above, and laid over the whole barracks, at an outlay of capital not more than is represented by the charge for importing this prime necessary of health and cleanliness, in the limited quantity at present available. At any rate the tank space should be increased, and this might be done with advantage on the higher ground behind the barracks. The surface water of the slope above, and the roof water also of Mescopulo barrack, might be stored at an elevation sufficient to enable a constant water supply to be laid on to all the barracks. Filtration would be necessary before the water was permitted to enter the tank.

Ablution and Bath Accommodation.—The means of personal cleanliness are insufficient. The ablution room is a small dark outbuilding without ventilation. It has low small windows. There are benches along three sides for holding the usual basins. The refuse water runs away by a surface drain, there are no gratings for men to stand on, and there is no water laid on. The men have to carry all the water they require for washing from the pump.

A larger ablution room, sufficient to accommodate a tenth part of the force at the same time, is required; it should be very light, well ventilated, drained, and supplied with water. There are no baths in any of the barracks. A proper bath-house with five baths and water laid on, and drained to the sea, should be constructed in a locality convenient for all the troops.

Cook-house—This is a small dark building containing boilers and a brick oven. There is roof ventilation, but not sufficient for coolness, and the oven requires so much fuel that the men prefer sending their dinners to be baked outside because it is cheaper. The cook-house requires improved steel boilers and a steel roasting oven. More roof ventilation should likewise be provided.

There is another small dark cook-house used by the royal artillery. It has an oven and open fireplace, but no boilers. Only few men use it, and with good management one cook-house should suffice.

Women's Wash-house.—The wash-house is a small lean-to shed, with a boiler in one corner, and a bench in the middle of the floor to hold tubs. The place is quite insufficient for washing the men's linen. A proper wash-house suitable to the size of the barrack with fixed tubs, and other conveniences, is much required.

Married Quarters.—These are at present partly in the ground-floor rooms of the side barrack ranges, partly in small dark lean-to buildings among the out-houses. The best that can be said of the accommodation is that it is better than none. But no better is available, and better quarters could only be obtained along with better barracks. All the existing married rooms require ventilation.

There is a very small serjeants' mess, entered by passing through the kitchen. There is no pantry nor place for beer. A separate entrance should be provided, and the pantry, &c. provided at the same time.

Library and Reading Room, &c.—This accommodation consists of two small dark rooms, very uncomfortable in appearance, and not properly fitted up. The allowance of oil for light is insufficient, and the lamps are of bad construction.

A good fives' court was built by the officers of the rifle brigade, but it is not kept in proper repair. There is a covered skittle alley made out of an old Crimean hut. The means of recreation are deficient, and far better library, reading, and day room accommodation is indispensable.

Canteen.—Dark, dirty, and unattractive. A new and good canteen is required.

Workshops.—There is an armourer's shop, which is too dark. The tailors' and shoemakers' shops are together in the same room a very objectionable arrangement. The room is reached by a dark passage; it has no ventilation, and the tailors' fire is outside.

Guard Room and Cells.—The guard room is at the entrance of the barrack square, and has the lock-up room opposite to it. The guard room has a shaft and inlet, but is too dark; and the lock-up room is so situated with reference to the parade ground and to the officers' staircase, that every word of conversation is heard in the lock-up. A new guard room and lock-up should be constructed near the fives' court.

We have said enough to show what kind of barrack accommodation is supplied by the Lazaretto, and we have restricted our recommendations to the points of greatest necessity, in the hope that the whole question as regards this important station may be considered with reference to providing suitable barracks in a better locality.

2.—*Mescopulo Barrack.*

This is a large private house built against the hill slope on the opposite side of the road, higher up than the Lazaretto barrack.

It consists of a basement story with openings only to the road, and having its back against the rock.

This basement is let separately from the barrack rooms and was occupied as shops.

Above it are two floors of rooms, each having eleven windows to the front, with an additional floor over the centre of the front. The buildings are carried back towards the hill, so that when looked at from that side they have a narrow centre and two large wings. These wings have windows on the four sides, and are occupied as barrack rooms, ablution room, &c., and the centre rooms are used for non-commissioned officers.

On account of the slope of the hill, the floor which appears as a first floor when seen from the front, is actually a ground floor when seen from the hill, with the higher ground sloping rapidly towards it.

We have already shown that during the first nine months of 1861, but chiefly during the third quarter of the year, nearly half the troops at the station were admitted to hospital on account of fever. A large proportion of the cases came from this very floor of Mescopulo barrack, and the rooms had to be evacuated in consequence. Removal to the floor above was found to arrest the disease. The disease was mainly due to the position of the building; for it has long been known that tenements built across the slopes of hills without attention to turning off the drainage from the higher levels, are particularly liable to have zymotic diseases among their inmates.

Besides this, the drainage of the court behind the barracks was in a very bad state, and the whole interior of the building had been rendered more damp than it otherwise would have been, by the ablution room, having been placed among the barrack rooms and under one of them. Damp from such a cause, in such a house and climate is only another name for malaria.

A nuisance is complained of which proceeds from rotting sea-weed thrown up along the shore. The only way to prevent the deposit of such matters would be to quay the margin into deep water. But regular removal of the deposit to deep water would diminish the nuisance.

There are nine rooms in the house, six of which are used for soldiers' quarters. The remainder are occupied by serjeants. The following table gives the accommodation :—

Rooms.	Regulation Number of Men.	Dimensions of Rooms.			Cubic Feet per Man.	Superficial Feet per Man.
		Length.	Breadth.	Height.		
Lower Story.		ft. in.	ft. in.	ft. in.		
No. 1 - - - - -	8	23 0	12 10	14 5	530	36
2 - - - - -	13	23 0	22 8	14 5	594	40
3 - - - - -	9	24 6	14 9	14 5	580	40
4 - - - - -	23	37 3	23 0	14 5	547	37
5 - - - - -	20	30 0	24 6	14 5	515	32
Upper Rooms.						
No. 6 - - - - -	40	50 3	30 6	13 9	527	38
7 - - - - -	40	50 3	30 6	13 9	527	38
8 - - - - -	8	18 9	16 10	13 9	550	40
9 - - - - -	13	24 2	24 2	10 2	458	45
Total - - - -	174	—	—	—	—	—

Overcrowding.—The degree of overcrowding allowed by regulation in this barrack is to be judged of by the superficial area per man, which is about one-half what it ought to be. The actual number of men in barracks has been considerably less at times than the regulation number. At the time of our visit there were 124 men in the rooms. For the reasons stated in regard to position and drainage, the upper-floor rooms are by much the best in every way, and are the only rooms which ought to be occupied.

The occupants of the lower floor will always be the most liable to fever. We would propose to reduce the numbers of men in the lower rooms by about a half, or from 73 to 40, and as the upper rooms are the highest above the ground and the least unhealthy we consider that if the number of men in them were reduced from 101 to 70 the reduction would be sufficient. The house would thus hold 110 instead of 174 the present occupation.

Ventilation.—The rooms have abundance of windows, but they are too low to ventilate sufficiently the upper part of the rooms. The rooms all require ventilation in the usual way by shafts carried up through the roof and by inlets for fresh air on opposite sides.

Drainage.—None except into a cesspit to the east of the barrack, which receives the drainage from the kitchen &c. There is a large foul open drain in the back yard.

There is an open or partially open drain also running to the public road. Both are objectionable and ought to be done away with. There is every facility for proper drainage to the sea.

To cut off the hill drainage, and to flag, channel, and drain the small square and ground behind this building, are improvements which ought to be carried out if the barrack is to be occupied.

Water Supply.—Same as for Lazaretto; and water is carried by contract.

Ablution and Bath Accommodation.—The ablution room is within the building, in one of the wings, and under a barrack room with only the floor boards between. The rooms near the ablution room have been unhealthy, simply because the air in them has been rendered damp and unwholesome by having a large wet surface constantly moistening the air. An essential improvement would be to remove the ablution accommodation altogether into a properly constructed ablution room outside, provided with water and drainage. The same bath-house proposed for the Lazaretto barrack would suit these barracks.

Cook-house.—The cook-house is in a small shed building above and behind the barrack. It has three rectangular boilers, but no oven. Improved steel boilers and oven are required.

3.—*New North Barrack.*

This is another hired building situated to the eastward of Mescopulo barrack, in a more open situation and not so much exposed to the drainage from the higher ground behind. It consists of a single building about 100 feet long, and two floors in height, with a passage and staircase in the middle of its length, dividing it into four barrack rooms, each having regulation space for 24 men at about 500 cubic and 37 square feet per man. The rooms are the best at the station, so far as their appearance goes. They have windows on opposite sides, but on the other hand the floors of the lower rooms are not raised above the surface, and their occupants are exposed to malaria from the ground.

The rooms have no ceilings, and no proper iron fittings. They have only hanging shelves.

There is a filthy damp space under the stair, which ought to be filled up.

The non-commissioned officers' quarters have fireplaces, and windows on each side. The floors are of wood resting on the ground.

Overcrowding.—This barrack has too many men in it. The lower floor should either not be occupied or the number of men should be reduced considerably. The upper-floor rooms should at the very outside have no more than 20 men in each room. This would give space for 40 men above, and as few as possible should be placed on the ground floor. Were there better accommodation available, the ground floor should be abandoned.

Ventilation.— None, except door and windows. Each upper room requires two louvres in the roof, and four inlets along each side close to the ceiling. The lower rooms require two ventilating shafts each, and four inlets along each side. The rooms have common fireplaces, which are never used.

Drainage.—Very bad. The surface paving is defective, and the surface drainage creates nuisance. There is no drain to the sea, although it is only 70 yards distant. All foul water, except such as evaporates or sinks into the subsoil, is conveyed to a cesspit close to the buildings, from which it percolates into the subsoil. Any matter collecting in this cesspit is removed every two years.

Although this barrack is healthier than the others, we were informed that the men occupying one of the rooms which is exposed to effluvia from the drainage, were not so healthy as the remainder.

The privies are those already described as over the sea.

Water Supply.—From the same source as in the other barracks.

Ablution and Bath Accommodation.—A shed building behind the barrack, dark, damp, and badly paved. Stone tables, all apparently ruinous. The whole requires reconstruction. There is no bath.

Cook-house.—A small lean-to, behind the barrack, fitted with two very thick rectangular boilers. No other means of cooking. Steel boilers and an oven should be provided. There is an open offensive drain passing in front of the cook-house, into which refuse water, &c. is thrown.

Provost Establishment.

The Provost establishment is at the south side of the Lazaretto barrack, and contains 9 cells certified for 28 days. They are in two floors, they have a verandah, and are ventilated by opposite grated openings.

Behind these are several seven-days cells quite unfit for occupation, partly from position, partly from want of ventilation. They are said not to be occupied at night.

4.—HOSPITAL, ARGOSTOLI.

This hospital is of recent construction and was first occupied in 1856. It is built on a terrace formed out of the hill slope, about 20 feet above the level of the sea, and at a distance of 50 to 60 yards from it. It is about 350 yards to the north-west of the barracks. A public road passes close to its front.

The site is airy enough on three sides, but on the side next the hill ventilation is completely cut off by the rock, which rises far above the buildings, while the site is otherwise open to the objection already stated against the barrack sites, namely, that the hill drainage passes into it. In this one of the latest erected buildings in the command, sanitary principles have been so little regarded that it has been placed on ground which ought either to have been avoided, or if occupied under the pressure of necessity, care should have been taken to cut off the hill drainage. There is, however, ample ventilation between the lower floors and the ground, an advantage not possessed by the barracks.

The hospital is two floors in height, and has a passage and staircase crossing the middle of it.

On one side the centre are two back-to-back wards on each floor: a form of construction inadmissible in hospitals. On the other side, on the ground floor, are the surgery, stores, hospital serjeant's quarter, and part of the medical officer's quarter. Upstairs there are on the same side two back-to-back wards, together with the remainder of the medical officer's quarters, which are cut off from the hospital and have a separate entrance.

There are six wards, originally intended to hold 90 beds, but the hospital is by no means capable of accommodating this number. The following table gives the details:—

Wards.	First Allotment of Beds.	Dimensions of Wards.			Cubic Feet per Bed.	Number of Beds per Ward at 1,200 Cubic Feet.	Windows per Man.		
		Length.	Breadth.	Height.			Number.	Height.	Width.
		ft. in.	ft. in.	ft. in.				ft.	ft.
4, each -	90	48 8	19 8	13 6	714	10	10	7	4
2, each -		22 10	19 8	13 6		5	2		
Total -	90	—	—	—	—	50	—	—	—

The wards were not overcrowded at the time we were in them, and they might very well hold 50 beds. This is a larger number of beds than ought to be required at this station if the barracks were as healthy as they ought to be.

Ventilation.—The construction is not well adapted for ventilation, as the wards have windows only on one side. The wards all require shafts carried up along the division wall between the wards above the roof. They should also have inlets for fresh air close to the ceiling.

The smaller wards require one shaft and two inlets each, and the larger wards two shafts and four inlets each.

The larger wards have stoves, in fireplaces, for warming. Ventilating fire grates, constructed for burning wood, should be substituted in lieu of these.

The passages, staircases, and stores all require ventilation.

Drainage.—Very bad. There is a narrow back yard between the hospital and the rock behind, in which are situated the kitchen, privies, a prison ward, &c. This yard is paved with pebbles, it is rough, and cannot be kept clean in consequence.

There are imperfect surface drains for removing the surface water into a main drain connected with the privies. This is an underground drain 18 inches by 14 inches, which after being conducted in the longest possible course round the hospital, has its outlet into the sea 40 yards distant. This drain is in a bad state, and great nuisance arises from it at times. It appears to be partially destroyed by rats.

Latrine.—The latrine is beside the kitchen, and is merely an open trough flushed out with sea water into the drain already mentioned. The place was in a most abominable condition on account of defective construction. The whole drainage requires renewal. As much as possible of the rain water from the higher ground should be diverted from the hospital, by a deep catchwater drain and tanked for use. The present main drain should be replaced by a nine-inch pipe drain carefully laid and well closed at the joints. Macfarlane's or Jennings' latrines should be introduced instead of the present trough, and flushed out as often every day as might be found necessary to prevent smell. If fresh water is not available, salt water might be used. The surface of the court between the hospital and the outbuildings should be flagged, and channelled to well-trapped gulleys. The urinal requires renewal.

There are no waterclosets connected with the wards, and the only position in which they could be placed would be in a projection from the front of the hospital opposite the staircase.

Water Supply.— There is a tank into which rain water from the roofs is collected for use, but the supply fails after the hot season, and water has to be carted by contract.

More tank space is required, and the only way of increasing the water supply would be to collect it from the hill above, filter it, and store it on higher ground than the hospital, so as to lay it on by gravitation.

With the present method of supply it is impossible to allow the sick sufficient water for cleanliness.

Ablution and Bath Accommodation.—None in the hospital. There is a damp dull ablution room with stone benches in the back yard behind the hospital, and a slipper bath in an out-house. It would be a great benefit to provide a fixed bath with hot and cold water laid on, and a small lavatory with two or three sunk basins, in the same projecting building where it is proposed to place the watercloset. The present arrangements are quite unfit for sick men.

Kitchen.—The kitchen is in the outbuilding behind. It is small, dark, and not properly ventilated. There are two cast-iron boilers, an open grate, and an oven, but it is stated that the means are insufficient for varying the diets. A good kitchen range is what is wanted, also light and ventilation through the roof of the building.

There are several deficiencies in the accommodation which require to be supplied. There is no accommodation for orderlies, and they have to sleep among the sick.

The pack store has no racks, and the bedding and pack store require a stove between them to dry the air. The windows into the passage from the medical store and pack store require bars for safety. There is no foul-linen store, and the foul linen has to be kept in the bedding store. The dead-house is a mere lean-to shed with an ordinary window. There is neither purveyor's store nor quarter.

Deficiencies such as these detract seriously from the efficiency of the hospital. They all require to be supplied, but it will be much more expensive to supply them now than it would have been to have included them in the original plan of the building.

5.—Fort St. George.

This is an ancient fort about seven miles S.E. of Argostoli barracks, situated on the summit of a conical hill several hundred feet above the level of the sea.

The lofty range called the Black Mountain rises to the height of 4,500 feet at a short distance to the east, and exercises a material influence on the temperature. The climate is cool and healthy, and affords a marked contrast to the hot oppressive air of Argostoli. Fort St. George is used as a place to which troops are sent to recruit, but the position is so favourable for health that a larger garrison might very well be placed in it to relieve as much as possible the troops quartered in the town.

Much of the fort is in a very ruinous condition, but more and better accommodation could be provided in it, at a trifling outlay.

There are at present two barrack rooms in a single block, one over the other, and quarters for two officers.

The barrack rooms are long narrow rooms with windows on opposite sides. The windows are few in number, and too low. They have shutters with small panes of glass in each to give light. More glass is required. The rooms are only wide enough to hold one row of beds. The lower room has earth against its back wall three feet above the floor. This should be cut away to a foot below the floor, and a flagged channel made to carry off the rain water. The upper room is a much better one. Neither room has any ventilation.

The lower room requires a shaft carried up by the wall near the middle of its length, to above the roof, and two inlets on each side close to the ceiling to admit air. The upper room should have a louvre in the middle of the roof and two inlets on each side. There are no fireplaces.

The barrack accommodation might be extended by repairing a large room close to the present barrack. This room has earth against one of its sides, which ought to be cut away, to at least a foot below the floor, and the space flagged and drained. The present stone floor should have a wooden floor placed over it with free ventilation below. The room would require ridge ventilation, and also a very large window in each gable to light the interior. This would afford plenty of space for as much barrack accommodation as would be required, and the site is admirably adapted for it, so far as health is concerned.

There are one or two married quarters in old arched rooms in the fort buildings.

If the barrack accommodation were extended to enable as many men to be removed from Argostoli as could be dispensed with there, additional serjeants' quarters, together with a few married rooms and a women's wash-house, would be required at Fort St. George. There is plenty of space for these buildings.

All the drainage is on the surface; the latrines are built over the edge of the escarp and the wall is filthy in consequence. It would be easy to remedy this evil and to provide against nuisance by projecting the latrine further out from the wall. But if the barrack accommodation were extended, latrines suitably drained would have to be constructed.

Water is derived from several ancient tanks under the works. They require cleaning out. The slopes for supplying rain water to them should be currented, and filters should be provided to pass the water through before it enters the tank. By this means a sufficient supply of water would be obtained.

There is no ablution room.

The cook-house is dark and unventilated. It has two boilers and no other means of cooking. Steel boilers and an oven should be provided.

The situation of this fort offers so favourable a contrast as regards health to the position of Argostoli barracks that it would be well worth while to improve and extend the barrack accommodation in the manner we have advised.

6.—Luxuri Detachment Barrack.

The town of Luxuri is a small sea-port on the west side of the gulf, about 5 miles from Argostoli barracks. It occupies a low flat part of the coast, with patches of stagnant sea water and a considerable amount of decaying vegetation in front of it. It is a very filthy place, without drainage or proper water-supply; the paving rough, and the surface drainage consisting of foul open gutters. The barrack is close to the sea, and is a square hired building in two floors, the upper one used as a barrack room for 20 men. In the lower floor is the guard room, cook-house, and ablution room, separated from the men's room above only by the thin boarding of the floor. The barrack room is reached by a ricketty outside wooden stair. It is nearly square, and has windows on all sides, with roof ventilators. The beds were rather crowded along the wall, but otherwise there was sufficient floor area and cubic space for the men.

The *Ventilation* was also sufficient.

Drainage.—None, except on the surface, and the paving in a very bad condition.

Latrine.—A dark unventilated shed with a bar placed over a hole to which the sea has access. It stands across the street midway on the quay between the barrack and the sea. The arrangements are most offensive and objectionable.

Water Supply.—None; all has to be carried by contract.

Ablution Room.—This is on the ground floor of the barrack. It has a stone bench and stone floor badly paved on which the foul water lodges. It is both damp and uncomfortable. There is no bath.

Cook-house.—Also under the barrack. It is in a bad state of repair, especially the floor. There are rectangular boilers and an oven, the latter not used.

The only favourable point in this barrack is its exposure to the sea breeze. It is one of the most uncomfortable places we have seen, and is more like a temporarily occupied detachment station during war, than a place where British troops ought to be barracked in time of peace.

If Luxuri is to be considered a detachment station, it ought to have a proper barrack constructed for 20 men with the requisite conveniences.

The town itself requires thorough sanitary improvement. It is in a disgraceful state at present.

7.—Hospital, Luxuri.

This place consists of three dark unventilated rooms rented in an old house not fit for human habitation, situated on the bank of a muddy creek in a low damp malarial position. It is surprising that any one could have entertained the idea of using such a place either for sick or for convalescents.

It is quite unnecessary to say anything more about it.

We looked at a new house which it was proposed to rent instead of this place. The position was bad, but the rooms were suitable, so far as rooms built for a private dwelling can be suitable for sick. There ought not to be many sick out of so small a detachment; but we were told that convalescents require to be sent for recovery from Argostoli to Luxuri. If such be the case we can only say that Luxuri is a most unfit place for such a purpose, and the statement speaks very badly for Argostoli hospital. Fort St. George would afford a much better convalescent station than Luxuri, and it would be free from the malaria which infects that filthy town.

VI.—ZANTE.

1.—Topography and Climate.

Zante is a triangular-shaped island about 22 miles long by 12 miles broad, lying about 10 miles south of Cephalonia. Along its west coast it is hilly, and to the eastward from these hills there extends a very fertile plain, running from N.W. to S.E., about four miles broad and 12 miles in length. At the south-eastern extremity of this plain, overlooking the sea, are two hills, one Mount Scopos, rising about 1,500 feet above the level of the sea; and the other, distant about four miles to the north, is the castle hill of Zante, about 654 feet in height. Between these two heights the coast forms a segment of a circle, along the northern part of which, and extending about a mile and a half in length under the Castle, is the town of Zante.

The island appears to belong chiefly to the tertiary period, and some parts of it abound in fossils. Gypsum occurs in masses at Mount Scopos and elsewhere; the subsoil is said to be generally marl and clay. There are abundant traces of volcanic action here as in other islands of the group. Some portions, as for example about Zante castle, appear as if they had been shaken to pieces by earthquakes. The soil is cleft by deep narrow ravines many acres in extent, the sides of which are damp from filtration of water, and they are probable sources of malaria.

The island is extensively cultivated, perhaps the best so of all the Ionian group. It is covered with currants, olives, oranges, &c. Here as elsewhere improved health has been observed to follow on improved cultivation.

There are no large swamps or marshes to affect the purity of the general atmosphere of the island. Whatever malaria exists is of local origin; and unfortunately there are still numerous patches of wet, uncultivated ground, and stagnant water, to which local diseases are distinctly traceable, besides the damp ravines and hill sides near the town.

Climate.—The only instrument for making meteorological observations is a thermometer, and the only data as to climate we have been able to obtain, are the following observations for one year 1859-60.

Months.	Mean Temperature.	Wind's Direction.	Weather.	Rainy Days.
	°			
January - - -	51·5	Northerly	Pleasant	9
February - - -	51·0	Southerly	Cold and Wet	15
March - - -	54·0	Northerly	Cold and Windy	14
April - - -	58·2	E.N.E.	Fine	1
May - - -	65·3	E.S.E.	Do.	1
June - - -	69·5	E.S.E.	Do.	—
July - - -	75·5	E.N.E., E.S.E.	Do.	1. Thunder.
August - - -	76·5	Do. Do.	Do.	—
September - -	67·3	N.W., S.E.	Do.	4
October - - -	66·0	S.W., N.E.	Do.	1
November - -	60·0	S.E., N.E.	Do.	—
December - - -	53·0	N.E.	—	9. Two shocks of an earthquake; much thunder and lightning.

As regards the general character of the climate. There are occasional high winds. When winds are northerly the air is dry and bracing, though sometimes piercingly cold in winter. A southerly wind produces a moist state of the atmosphere. In summer there is great heat, but not oppressive unless the wind blows from the south at the same time. This wind (the sirocco) causes languor and headache, but no distinct disease. The summer heat appears to increase the prevalence of continued fever, and also the tendency of this form of fever to pass into typhoid.

Fevers are most prevalent from June to October inclusive, July appearing to yield the largest proportion of cases.

Chest affections are most prevalent in January, February, and March, and bowel complaints between June and October.

Taken as a whole the climate of Zante is a healthy one.

2.—Mortality and Diseases of the Native Population.

We have given in Appendix 17 the only account of the mortality and diseases of the island we have been able to obtain. It was kindly prepared for us by the Director of Health, from such statistical data as exist in his department, at the request of Sir Henry Storks, the Lord High Commissioner, who was himself present at our inquiry and accompanied us on our inspection of the town. There appears to be no proper registry of deaths, so that the relative proportion of mortality occurring from different classes of disease cannot be ascertained, and we have considerable doubts likewise whether the return contains all the deaths.

The following are the general results of this return:—

The mean population of the island during the five years 1856-1860 was in round numbers 38,000, and the total mortality 4,405, giving a mean mortality of 881 deaths per annum. The mortality was distributed as follows:—

In the town of Zante, with a population of 15,000, there died during these five years 2,230 persons, or 446 per annum, affording a death rate of 29·7 per 1,000; and in the country, with a population of 23,000, there were 2,175 deaths, or 435 per annum, the death rate being in this case nearly 19 per 1,000.

The prevailing causes of mortality are not given, but the prevailing diseases in the island are gastric, and gastrico-bilious fevers; intermittent and remittent, sometimes assuming the character of pernicious remittent fever; and also typhoid fever. These fevers are most frequent in summer and autumn, and after a wet spring they take on an epidemic character. They chiefly occur among the inhabitants at the two extremities of the town, and are attributed to stagnant water at the southern extremity, and to stagnant air caused by the hills at the northern extremity. These diseases likewise occur in the country, and are confined to situations where there is want of drainage, and stagnant water.

Besides fevers there are inflammatory diseases, such as bronchitis, pneumonia, dysentery, diarrhœa, and acute rheumatism. Exanthematic fevers, and diphtheria occur sometimes sporadically, sometimes epidemically. Croup is a very rare disease. Cases of tubercular consumption often occur. Calculus is of rare, gravel of more frequent occurrence.

In certain villages cases of Greek elephantiasis show themselves.

The general sanitary state of the country is said to be improving under extended cultivation and other sanitary ameliorations; but it is evident that the most frequent diseases are still those connected with neglect of drainage, overcrowding, bad ventilation, and generally defective sanitary police.

We next proceed to state very generally the condition in which we found the town.

3.—Sanitary State of Zante (Town).

The town consists of a long narrow strip of houses, 2,500 yards in length, by from 200 to 300 yards in breadth, built on the flat shore under the castle, and extending southward in the direction of Mount Scopas. Part of it is also built on the slopes of the castle hill. The main street and quays run nearly north and south, and as seen from the bay the town has a much better appearance than most other Ionian towns. It consists essentially of a single long principal street, with narrower shorter streets running parallel to it, and a number of narrow lanes crossing these streets at right angles.

Many of the houses are of a superior character, but the greater number of them, inhabited by the mass of the population, are like other houses of eastern towns, crowded with people, badly ventilated, and dirty.

The streets and alleys in the poorer quarters are narrow, tortuous, and not arranged so as to admit air currents freely among the houses. This customary defect in Levantine towns can only be removed by building wide straight streets through the worst parts of the town to admit of a free passage for the sea breeze in all directions.

Above the eastern end of the town, and close to it, rises the massive lofty hill on which the castle is situated, with other high ground to the northward, which intercept all north-west winds from the houses. The drainage from the porous strata of which the hill is composed, penetrates towards the lower levels on which the town is built. To the southward the shore is low and flat; the line of houses rising almost directly from the water. The natural outlet for the drainage of much of the higher cultivated ground behind the town, is across this part of the town.

There is some low land in this direction under water in the rainy season, to which malaria is said to be attributed by the inhabitants.

The position of the town taken as a whole cannot be considered as naturally healthy, and certainly no sufficient precautions have been adopted as regards drainage and other sanitary works to diminish its liability to malaria. In all similarly situated towns an undrained subsoil, especially if it happens to be porous, or large sections or declivities of damp porous rock, or of earth, are just as prolific sources of malaria as undrained marshy land.

The principal defect in the town is indeed the condition of the drainage, and of the outlets. There are several sewers carried across the breadth of the town, which open into the port. These sewers have been apparently constructed without any knowledge of the principles of town drainage. As we saw them they were large conduits partly ruinous at their mouths, and allowing their contents to run in the open air before mixing with shallow sea water in the port. For some distance round the openings there were accumulations of filth and decaying substances, darkening the sea water, and causing great nuisance from decomposition. The sewers were much too large, and were evidently not properly supplied with water to keep them clear.

The margins of the port are shallowing from deposit of various kinds, and unless steps be taken to remedy the evil by proper quaying, and by deepening the water, the public health will certainly suffer.

The household conveniences are said to be of a very defective kind. There are very few latrines, and those of a rude unhealthy kind.

We would strongly recommend that the sewerage and drainage of the whole town be examined by a competent sanitary engineer, and a plan drawn up for gradually draining the site itself as well as the houses.

The surface drainage and paving are not so good as they ought to be.

The paving is usually very rough, and the channelling not sufficient for carrying off water rapidly. The surface cleansing is not sufficiently attended to. A water supply has been brought into the town, but we have not been able to obtain any satisfactory information about either its source, quantity, or quality. It is laid on to public fountains, but not to any extent to private houses. It is evidently not laid on in connection with the town drainage.

One of the most painful sights we ever saw is the civil hospital of Zante. It is part of a two-story building situated in a narrow street close to the shore at the northern end of the town. The ground floor of this building is the hospital, the upper floor is another institution.

A narrow dark passage in the middle of the ground floor gives entrance right and left to the wards. They are low, dirty, narrow, unventilated rooms, without any conveniences for the care or treatment of sick. Not even a dead-house; for when we were in the place a corpse waiting for interment occupied nearly half the breadth of the entrance passage. The accommodation is supposed to be for 40 beds; but according to the municipal regulations part of the beds are occupied by old people who are invalids. The place therefore partakes of the character of a poor-house, as well as of a hospital. An arrangement repugnant to every feeling of regard either for the sick or for the aged.

The admissions and deaths in the hospital part are given in Appendix 17, from which it appears that during the five years 1856 to 1860, out of 291 admissions there were 70 deaths, equal to 24 per cent of the admissions; an enormous mortality, more like that of a pest hospital during plague than of a general hospital for the reception of all cases.

We have received no account of the causes of death, but the table gives the predominating diseases as intermittent, typhoid, and gastric fevers, rheumatism, syphilis, scrofula, consumption, and dropsy;—diseases which, with anything like a chance of recovery, ought certainly to afford no such mortality. We must look for the cause of the excess of deaths to the frightful state of the hospital. It is not for us to say who is chargeable with this grievous neglect; but a sense of humanity and regard for the poor renders it necessary for us to state our opinion that not a day should be lost in building a proper hospital for sick and a suitable asylum for the aged and infirm.

The steps now being taken by the Government of Malta in regard to this very question ought to be followed by the local authorities in Zante, and they should at the same time organize a sanitary administration for the execution of sanitary works and for the prevention of disease.

4.—Mortality and Diseases among the Troops.

Zante has afforded in times past a very high average mortality among the troops. For the 20 years preceding 1836, the deaths were in the ratio of 32 per 1,000 out of an average strength of 397 men. Of this high ratio 17·6 deaths per 1,000 were due to fevers. Nearly two-thirds of the fever deaths were due to remittent and about one third to continued fever. There were only four deaths reported from intermittent during the entire period of 20 years.

After fever the next most fatal disease was dysentery, the annual mortality from which was as high as 4½ per 1,000 strength. Next in fatality was consumption and chronic catarrh, which gave a death rate of above 3·2 per 1,000.

During the succeeding 10 years the average strength was 280, and the average death rate was 19·6 per 1,000. The rate varied much in different years. In 1841, when the number of men at the station exceeded that of any other year of the period, the death rate was as high as 40·2 per 1,000. It is worthy of remark that in 1843, the year when the force was smallest, the death rate fell to 9 per 1,000. Fevers, two-thirds of which were of the remittent, one-third of the continued type, occasioned an annual death rate of 7½ per 1,000. Chest diseases, chiefly phthisis and chronic catarrh, occasioned 4·6 deaths per 1,000, and bowel diseases, diarrhœa, cholera, dysentery, a mortality of 2½ per 1,000. We learn from a return (Appendix 18) prepared for us by the medical officer in charge, that between 1st April 1850 and 31st December 1859, there was an average strength in barracks of 394, except during the period intervening between 31st March 1855 and 21st August 1856, when Zante was garrisoned by a militia regiment.

During 8 years and 4 months included in this return, the average mortality among the troops of the line was only 9·7 per 1,000, and the diseases showed a remarkable change in character. There was only one death from remittent fever during the whole period, but above a third of the mortality arose from continued fever, and nearly half the mortality from continued and typhoid fevers conjointly. Nearly a fourth of the deaths were from chest diseases, chiefly consumption.

The militia regiment suffered severely from cholera. Between 25th October and 21st November 1855, there were 31 of them admitted to hospital for this disease; of whom no fewer then 24 died, seven cases only recovered.

In 1859, the mortality in the garrison was very low, only 6·6 per 1,000, but it is of importance to remark that it was due solely to miasmatic diseases. The year 1860 was a healthy year; there was only one death (from typhus fever) out of a strength of 325. The admissions to hospital amounted to 343, of which 12 were from intermittent, 33 from remittent, 17 from continued, and 8 from typhoid fevers. Admissions from fever were 20 per cent. of the total admissions.

During the first nine months of 1861, up to the time we were in the islands, the average strength of the garrison at Zante was 319, and the admissions to hospital were 210, of which 51 were from continued and two from intermittent fever. During the third quarter of the year, at the time when continued and typhoid fever prevailed at Corfu, there were 88 admissions to hospital at Zante, of which 42 were from continued fever.

The most important diseases in this garrison are proved by these statistics to be of the same character as those which prevail at the other stations in the Ionian islands, and they indicate the operation of the same class of causes in this as in all the other stations.

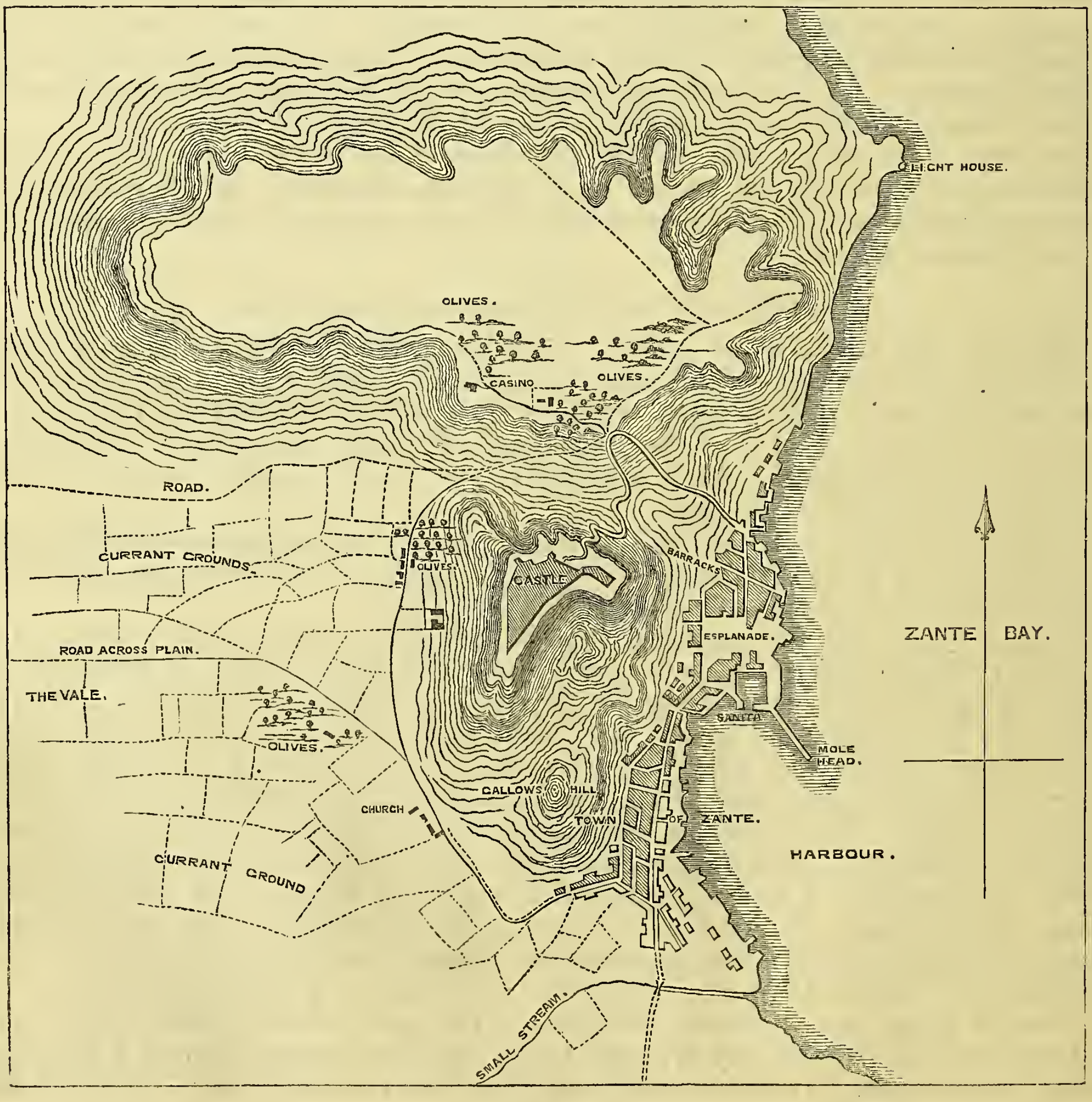
We next proceed to describe the barrack and hospital accommodation.

5.—Sanitary Condition of Barracks.

There are two barracks in Zante, one in the town; the other on the summit of the castle.

Their topographical position is shown in Fig. 33.

Figure 33.—Zante Castle and Town Barracks.



1.—*Town Barrack.*

This is an old Venetian building, said to have been originally an hospital, and given over by the Ionian Government for a barrack in 1838. It is situated at the northern extremity of the town, at a short distance from the sea. But the sea breeze is excluded from the building by streets of houses, and by a lofty church forming part of the street out of which the barrack yard is entered. On the side away from the sea the steep slopes of the castle hill rise to the height of several hundred feet, and cut off the north-west winds. The rainfall from the heights above, and the subsoil water gravitate directly upon the ground covered by the barrack, and the foundations of the streets cut across the natural outfall of the drainage toward the sea. The position therefore is not a good one. It is exposed to damp, malaria, and stagnation of air, and cannot be healthy, especially with a large number of men barracked together upon it.

The neighbouring civil population suffers from miasmatic diseases to a considerable extent; and the only way of diminishing their frequency among the troops is either to remove the troops altogether out of the locality, or to put as few men into the barrack as possible, at the same time using every precaution to improve the general sanitary state of the building. But it would be better and cheaper in the end to build a proper barrack in a healthy position; for as long as the present building is occupied the men will suffer more or less from fevers.

The ground within the barrack boundary is an irregular area of 1,822 square yards, mostly behind the church, but part of it at one end of the church where the entrance gate is. The surface soil is gravel and the subsoil marl, which latter also constitutes the mass of the high ground immediately behind.

Along one side of the boundary wall, beginning from the public street, are placed the guard room and cells, privy, cook-house, and wash-house; and the barrack is a square building standing detached within the area.

It is in two floors, entered by a door in the middle of its front. Immediately within the door there is a square hall affording entrance to the ground-floor rooms, and containing a staircase, which gives access to the rooms on the floor above.

Out of the hall on the ground floor are entered a non-commissioned officers' room right and left, a barrack room right and left, and one barrack room in the centre. At the top of the stairs are three barrack rooms, one right and left, and one in the centre.

The construction is rather an uncommon one, and affords on each floor two rooms to the outside wall each, from its position having windows along one side and also at one or both ends, and in the middle of each floor one room with windows only at one end. The whole six rooms and the non-commissioned officers' rooms have community of ventilation by means of the halls and stairs, and foul air passes freely from one room to another throughout the building.

The following table gives the accommodation.

Rooms.	Regulation Number of Men per Room.	Dimensions of Rooms.			Cubic Feet per Man.	Superficial Feet per Man.	Number of Men at 600 Cubic Feet each.	Windows.		
		Length.	Breadth.	Height.				Number.	Height.	Width.
		ft. in.	ft. in.	ft. in.					ft. in.	ft.
2	23	44 10	20 1	12 8	496	35	19	4	6 10	4
3	22	36 6	20 1	12 8	422	33	15	2	6 10	4
4	23	44 10	20 1	12 8	496	35	19	4	6 10	4
6	30	58 0	20 1	12 10	499	39	24	6	6 10	4
7	24	36 6	20 1	12 10	392	30	15	2	6 10	4
8	30	58 0	20 1	12 10	499	39	24	6	6 10	4
Total Men -	152	—	—	—	—	—	116	—	—	—
2 Rooms, Non-commissioned Officers' -	1	20 1	13 0	12 8	3,307	261	—	2	6 10	4
Guard Room -	20	28 0	16 0	15 0	336	17	11	2 1	4 0 5 0	3 4
Lock-up - -	4	16 0	7 0	15 0	420	28	—	1	3 0	2

Overcrowding.—If we take 600 cubic feet per man as our standard of accommodation, this barrack will hold 116 men instead of 152, but in such a locality and with such a construction as this barrack exhibits it will by no means contain 116 men and keep them in health. The superficial area per man should be at least double what it is, and hence 76 men is the largest number the barrack ought to contain.

Ventilation.—The window space in the middle rooms is deficient, but this cannot be remedied. The lower rooms have ventilating shafts in the walls, and the upper rooms have openings in the roof, but they are not sufficient to keep the air pure at night, and when we were there all of them were closed up. The only remedy for this defect is to introduce shafts and inlets constructed on the principles shown on Plan X., Fig. 2.

The proportion of sectional area for outlets and inlets to cubic contents required for Zante barracks is that laid down in the first part of this report; and in improving the ventilation of these rooms the present extent of inlet and outlet for each room should be increased, if necessary, up to the amount specified above. All the openings of both outlets and inlets inside the rooms should be louvred, to throw any stray currents up to the ceilings. This precaution is the more necessary on account of the local position of the building, and the probability there is of the wind beating down upon it from the hill side above during high winds. If after these improvements are carried out the ventilation is still insufficient at night, additional inlets should be made close to the ceilings.

Drainage.—The drainage of the barrack ground is on the surface towards one or two underground drains; much of it sinks into the subsoil. Part of the surface is well paved.

The surface drainage within the latrines was very bad. Foul putrescent liquid was lying on the surface, and we were told that illness had been sometimes traced to this cause.

There is a covered sewer for rain water which joins the sewer leading from the privies near the gate to the sea. The latter is no less than 2 feet 3 inches high, by 2 feet wide; square in section, and arched over; the worst of all forms for a drain: and in this instance the size is so large that the sewer is nothing but a long cesspit, in which the privy soil accumulates till it is flushed out, creating great nuisance, and constantly endangering the health of the men. Into this sewer the other drains all empty.

Latrine.—The latrine is simply a large trough at the head of the drain. It is washed out only three times a week. When we saw the place it was in a most offensive condition.

The surface drainage of the latrine requires to be properly attended to, so that no water shall lie on it. As regards the sewer, the best thing to do would be to replace it by a 9-inch pipe drain. The distance to the sea is only 70 yards. The present latrine should be replaced by one of Macfarlane's or Jennings', and flushed out once or twice a day, according to the season.

Adjoining the latrine is a bad porous stone urinal, also a nuisance. It should be replaced by one of iron or slate, provided with water for cleansing.

The latrine buildings should be lighted and ventilated through the roof.

Water Supply.—Water for the use of the barrack is collected from the surrounding heights. There is a tank of brackish water in the yard, and the town supply is outside the gate. Water is not laid on for any purpose, but should be introduced without delay. A raised tank, with a pump to fill it, is required, to afford water for ablution, and also for supplying water for the latrine.

Ablution and Bath Accommodation.—This consists of a small triangular apartment built against the boundary wall. It has a door and window, and a stone bench on two sides to set basins on. The foul water is drained from the back of the bench into a vertical pipe communicating with the privy drain. There is no water except what is carried by a fatigue party from the town water supply outside. There are no baths. One would be required for the reduced strength of 76 men recommended above, and water should be laid on to it.

Cook-house.—The cook-house is next door to the privy. It has the usual boilers; and brick ovens not used for want of fuel, besides which they appeared to be in bad repair. Steel boilers and an oven should be supplied. Refuse water is poured down a grating communicating with the privy drain. There is no water supply except what is carried by hand.

Women's Wash-house.—None. There are iron drying posts.

Guard Room.—Both guard room and lock-up are too small. They are lean-to buildings only partially ventilated. Additional roof ventilation is required. There are no cells, a want said to be much felt.

Officers' Quarters.—None in town; the house formerly used for the purpose has been given up.

School Room.—This is a large room in town, rented for a chapel and school.

2.—*Zante Castle Barracks.*

Zante Castle occupies the summit of a steep hill 654 feet high, rising directly from behind the houses of Zante at the north end of the town, and overlooking the sea and nearly the whole island.

The summit is inclosed by old walls, surrounding an area of 20 acres and 3 rods. The surface soil is a reddish clay, resting on a subsoil of blue clay and marl; by no means a healthy soil in a warm moist climate. The ground within the walls is at different elevations, some buildings being many feet higher than others. But the whole surface is exposed to every wind that blows, and sometimes the winds are very high. No malaria can reach the castle except such as may rise in still warm weather from the numerous deep damp ravines descending from it on nearly all sides.

The south point of the castle is the most elevated, and from thence the ground slopes towards the north. All the buildings are on this slope, they consist of officers' quarters, barrack rooms, hospital, chapel, school, library, stores of various kinds, married quarters, guard room, cells, &c.

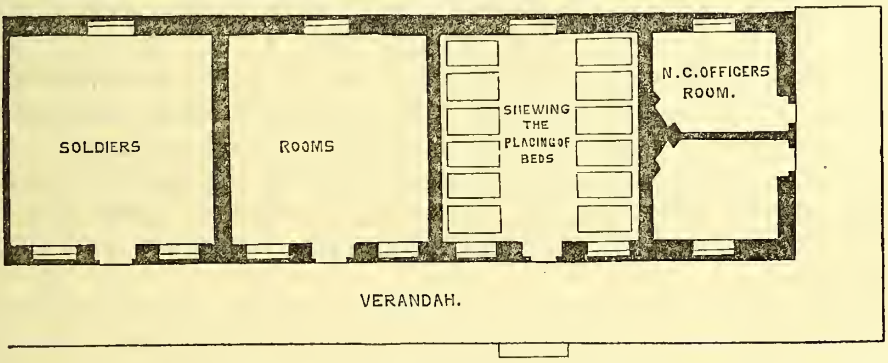
A number of the existing buildings are of recent construction, and were erected to supply the accommodation destroyed by the earthquake of 1840. The others are buildings of an older date, some of them partly ruinous, and there are two or three old chapels now used for military purposes.

The principal barrack accommodation is in a recently constructed, long, one-floor building with an open roof and a verandah along the south side. It is the most elevated of the barracks, and is divided transversely into a number of men's rooms, each having its separate door from the verandah, with a window on each side the door, and a window at the end opposite the door.

Each division has regulation space for 12 beds, six along each side. At one end of the range are two non-commissioned officers' rooms, and there is another non-commissioned officer's room with an orderly room at the opposite end. The whole range is 213 feet 6 inches long, and 25 feet wide exclusive of the open verandah. This building is known as barrack C.

A ground plan of a portion of it is given in Fig. 34.

Figure 34.—Ground Plan showing the General Construction of C. Barrack, Zante Castle.



A few yards from the western end of barrack C., and built at right angles to it, is another single barrack room E., for 30 men. Barracks D. and F., one room each, are further down the hill. There are in all 11 barrack rooms, with regulation space for 174 men; and four rooms for one non-commissioned officer each.

The following table gives the details of this accommodation :—

Rooms.	Regulation Number of Men per Room.	Dimensions of Rooms.			Cubic Feet per Man.	Superficial Feet per Man.	Number of Men at 600 Cubic Feet each.	Windows.		
		Length.	Breadth.	Height.				Number.	Height.	Width.
		ft. in.	ft. in.	ft. in.					fti	ft. in.
C. 8 Rooms -	12	21 0	21 0	14 6	533	37	10	3	7 0	3 6
D. 1 Room -	20	39 0	14 6	11 3	314	28	10	3	4 9	2 10
E. 1 Room -	30	61 3	20 1	13 0	533	40	26	7	4 3	3 0
F. 1 Room -	28	47 4	16 6	11 8	325	28	15	4	5 0	3 3
Total Men -	174	—	—	—	—	—	131	—	—	—
C. 4 Non-commissioned Officers' Rooms -	1	14 0	10 1	14 6	2,047	140	—	1	7 0	3 6

Rooms.	Regulation Number of Men per Room.	Dimensions of Rooms.			Cubic Feet per Man.	Super-ficial Feet per Man.	Number of Men at 600 Cubic Feet each.	Windows.		
		Length.	Breadth.	Height.				Number.	Height.	Width.
Guard Rooms.		ft. in.	ft. in.	ft. in.					ft. in.	ft. in.
Magazine -	10	14 3	12 0	9 6	162	17	3	1	3 6	2 6
Castle Gate -	10	16 9	16 0	11 0	295	27	5	1	2 6	2 0
Cells.										
5	1	13 0	7 0	7 6	682	91	Hard Labour	1	1 3	3 6
1	1	8 9	8 9	7 6	570	76	Solitary	—	—	—
1	1	10 0	8 9	7 6	656	87				
1	1	10 6	6 0	7 6	472	63				

Overcrowding.—By giving as nearly as may be 600 cubic feet per man these rooms will hold 131 men, or 43 fewer than their present allotment. This is the largest number they ought to contain. In so exposed a position, and with good ventilation, there should be no danger of overcrowding with this number.

The overcrowding in the guard rooms is excessive, and is the greatest we have ever met with. How can men be healthy who have to pass a period of disturbed rest during every 24 hours they are on duty in 162 cubic feet of space and 17 square feet of surface? New guard rooms are required, for the present ones will not hold half the requisite number of men.

Ventilation.—None of any consequence, except doors and windows. There are no fireplaces. Barrack C., with 12 beds arranged along the wall, six on each side between the opposite windows, is not well constructed for ventilation. It would have been very much better to have had the windows along the same sides as the beds. In the other barracks this is the case. The rooms of all the barracks have open roofs, with one exception.

To ventilate them properly each room in barrack C. should have a louvred shaft in the middle of the ridge, and one inlet at each end at the eaves.

The other rooms require two louvres each at equal distances along the ridge, and three inlets along each of the opposite sides at the eaves.

Drainage.—The entire drainage of the castle is on the surface by rubble-paved drains, many of them very uneven and having foul water lying in them. In one such drain under a barrack window there was putrid urine and other noxious matters.

At the lower end of the slope near the gate the surface drainage is received into brick underground drains, and passed through the works, to escape as it best may.

The privies are all undrained, and are over cesspits, which are said to be emptied periodically by contract.

In one exceptional case the privy is constructed over the edge of the scarp without any provision of the kind. In one instance the cesspit is at the foot of the scarp. The soil is conveyed to it by a pipe, and when we were there it was undergoing cleansing which consisted in simply drawing the putrid fluid out of it and throwing it down the slope. This was done by permission of the barrack master, notwithstanding the terms of the contract, which exact removal of the matter.

The process gave rise to an abominable and dangerous nuisance. These cesspits are simply intolerable in such a climate. They are by no means unimportant agents in predisposing men to continued and typhoid fevers, although only exposed temporarily to their emanations.

The latrine attached to the officers' quarters is merely a wooden shed, over a cesspit in a hole in front of the mess room. The surface drainage of the neighbourhood finds its way into this place, and no doubt percolates into the porous subsoil, finding a convenient outlet probably into some water-tank at a lower level.

Zante castle requires drainage, and all the latrines require to be reconstructed on Macfarlane's or Jennings' principle and flushed out daily. Either the fluid must be carried down the slope of the hills to a sufficient distance, and used to irrigate waste land, of which there is plenty; or it should be collected in an iron tank at the lowest possible level, and removed by a cart; or else a pipe drain should be carried down the slope to the sea.

The surface drains should be better made, and proper channelling should be laid down.

Water Supply.—Water is obtained from surface drainage, which supplies tanks and wells after being filtered. The tanks can hold 157,000 gallons, besides that obtained from the wells. During dry weather the water runs short, and is observed to contain impurities.

Water has then to be supplied by contract. The total cost of this extra water in 1856 was 94*l.* 0*s.* 3*d.* for the station. (Appendix 11.)

The quantity of water could be increased to any necessary extent by collecting all the roof water and as much additional surface water as might be required. It would all have to be carefully filtered.

The means of raising and distributing the water for use are rude and imperfect. There is only one pump. At all the other tanks and wells a cord and pulley are used, and every drop of water has to be carried to its destination by hand. There is no such thing as a water-pipe. The system of raising water from tanks by a rope and bucket is highly objectionable on account of the impurities which find entrance to the tanks. Every tank should have a pump.

Ablution and Bath Accommodation.—This is a small stone building with a stone floor, a stone bench for basins, and a 250 gallon tank for holding water, all of which has to be drawn and carried by hand labour for a distance of 25 yards. The ablution room is situated between the two largest barracks at the higher end of the ground.

The waste water from the ablution room passes into an open pit, which overflows into the adjacent urinal, whence it runs, together with the urine, into the open surface gutter already alluded to under the barrack room windows, to the front of the cook-house, and thence to the escarp wall, down which it trickles.

The ablution room has no ventilation, and no bath.

A louvre should be placed in the roof; water should be laid on to the tank by means of a pump; and if it be possible to afford water for the men even for one bath a week, it would be of great importance to cleanliness to do so. This could only be done, however, by collecting all the roof water, and more of the surface water, and by placing tanks at a sufficient elevation to deliver the water by pressure.

Cook-house.—The cook-house is situated at the upper end of the castle area, at no great distance from the ablution room.

It is supplied with boilers, oven, and a fireplace. The oven is never used because the fuel ration is insufficient on account of imperfection of the apparatus. There is no water laid on, and no drainage, except by an open gutter. Water for cooking has to be carried from a tank. The cooking apparatus is not in good condition, and the cook-house requires roof ventilation.

The artillery cook-house is a small apartment with only a single boiler. These cook-houses require steel boilers and a steel oven.

Women's Wash-house.—This is also a small room next the cook-house; it has no conveniences except a fireplace and a bench. There are drying posts outside.

Married Quarters.—Besides the quarters for non-commissioned officers in the barracks, there are two or three quarters in a detached hut lower down the hill. The former contain each one room, they are good so far as the extent of accommodation goes; each room having a separate door, window, and fire-place. The others are not so good.

Means of Instruction and Recreation.—There is a ball court, and a skittle alley under a ruinous wooden shed.

There is a small library and reading room with games, over a stable, smelling strongly of ammonia. It has no table, and is by no means a sufficiently attractive place. It requires great improvement. There are two schools for the station.

There is no gymnasium, and no shade except one verandah. The means of recreation are deficient.

Guard Room and Cells.—We have already pointed out the enormous overcrowding in the guard rooms; but besides this they have no ventilation, and there is no lock-up. The cells on one side the court have openings only over the door. They require shafts at the ends. There is no ablution room attached to them, and they are much too small for health in such a climate.

3.—Hospital, Zante Castle.

This hospital receives sick from both castle and town barracks. It is situated close to the defences on the east side, near the higher end of the castle area, in an airy healthy locality. It is a long one-story building within an inclosure; having a verandah on three sides, and a range of out-offices behind. The floors are raised to admit of a passage of air beneath them. There is a quarter for the surgeon at one end, and a quarter for the hospital serjeant, together with the surgery at the opposite end. These have separate entrances. A passage traverses the building from front to back, and a short corridor within, on each side, gives access to the wards.

The apartments nearest the passage are, one of them used as a store, the other which is of the same dimensions is used as a ward. These rooms have each one window at one end. The other two rooms, which are both of the same size, are used as wards, and have two windows at each of the opposite ends; the beds are arranged with their heads along the dead walls between the opposite windows. The accommodation is as follows:—

Wards.	Regulation Number of Beds.	Dimensions of Wards.			Cubic Feet per Bed.	Superficial Feet per Bed.	Number of Beds at 1,200 Cubic Feet each.	Windows.		
		Length.	Breadth.	Height.				Number.	Height.	Width.
		ft.	ft. in.	ft. in.					ft.	ft. in.
No. 1 - -	4	25	12 0	12 2	912	75	3	1	7	3 6
2 - -	11	32	22 0	12 2	778	64	7	4	7	3 6
3 - -	11	32	22 0	12 2	778	64	7	4	7	3 6
Total, 3 - -	26	—	—	—	—	—	17	—	—	—

Overcrowding.—In a small hospital such as this, and on so airy a site, 1,200 cubic feet per bed ought to be enough of space, and at this rate the building ought to contain 17 beds, in place of 26, its present number. The accommodation required to complete the hospital space, could be obtained by extending the two ends of the building and converting them into wards, and by constructing a separate surgery, quarters, and stores.

Ventilation.—The structure of the building is not favourable to ventilation. It would have been much better to have had the windows along both sides of the wards instead of at the two ends, and this should be kept in view in adapting the ends of the buildings for sick wards. There are openings in the ceilings, but no proper louvres, and there are no inlets for fresh air. A ventilating shaft, louvred above and below, should be carried from the middle of each ceiling above the roof, and a large inlet should be placed at each end of the larger wards under the eaves. In the smaller wards one inlet will be sufficient, and the shaft should be carried up at the end furthest from the window.

Drainage.—This is entirely on the surface, and the outlet is above the level of the yard. The roof water is collected by guttering and discharged into boulder-formed gutters which convey it down the hill. It would be much better to collect all the roof water into an iron tank sufficiently high to receive it and to lay it on for hospital use.

The *Latrines* are simply open privies over cesspits, a few yards behind the hospital. Both latrines and urinal are very offensive, and are a serious nuisance to the patients. They require reconstruction as water latrines, and the drainage from them should be connected with the general system of drainage for the castle. There are no waterclosets.

Water Supply.—Same as that of the barracks, and requires similar extension, and improvements in distribution.

Ablution and Bath Accommodation.—This is outside the hospital, and is of the common barrack construction. There is only a slipper bath and a shower bath, with a boiler for heating water. The arrangement is insufficient. In enlarging the hospital provision should be made for one fixed bath and a proper ablution table.

Kitchen.—The kitchen is behind the hospital. It contains an oven, a copper boiler, and a fireplace. These means are not sufficient for varying the diets, and a suitable hospital cooking range should be provided.

Orderlies' Rooms.—None, except the small ward misappropriated for the purpose. Only the hospital serjeant has a quarter, but it is outside the hospital. The deficiency is very much felt, and can be provided for in altering the building.

Storage. —Very deficient. There is only one room for all purposes, and the room is really deducted from the hospital accommodation. When we were there the dead-house was used as a foul bedding and wood store.

There is no purveyor's quarter.

Such as it is, this hospital is one of the best in the command, but it is wanting in many things required for the treatment of sick.

It would be a great relief at this station to have a single room for sick wives and children of soldiers, especially for midwifery cases.

In this our report on the sanitary condition of the Mediterranean stations we have endeavoured to give a sufficiently detailed account of the existing sanitary defects, and the principles on which improvements should be carried out to enable these defects to be remedied. The work is one of no ordinary magnitude and importance. Our examination of these stations has clearly shown what are the local causes which have so powerfully contributed in times past to those outbreaks of pestilence from which troops and civilians have alike suffered. Considerable expense will have to be incurred before the garrisons can be considered safe from future visitations of these diseases; but this is unavoidable.

The first and most necessary work, and the one in which the smallest relative cost will be incurred, is ventilation of barracks and hospitals.

Next should follow drainage and water supply, not because they are less important, but because they involve the introduction of special arrangements requiring time.

After these must follow the very important question of additional barrack accommodation.

All the hospitals require to be improved without delay. We have already prepared plans for the re-arrangement of the hospital at Gibraltar and for new hospitals at Malta, which are works of immediate necessity; and we would strongly recommend that the erection of the proposed new hospitals be proceeded with at once. Whatever cost it may be necessary to incur for the improvements we have advised will be money well laid out, and will be amply repaid by diminished sickness and increased efficiency among the troops serving in these important garrisons.

DOUGLAS GALTON.
JOHN SUTHERLAND.

J. J. Frederick, Secretary,
War Office, 12th January 1863.

APPENDIX TO REPORT ON GIBRALTAR.

No. 1.

R.E. METEOROLOGICAL OBSERVATORY AT GIBRALTAR.

Latitude 36° 6′ 23″ N. Longitude 5° 20′ 53″ W. Height above the sea, 46 feet.
Corrected in 1858 to Latitude 36° 6′ 20″ N. Height above the sea, 50 feet.

ANNUAL REGISTER, compiled from the Results of the Monthly Observations.

1852.

Months.	Barometer.		Thermometer.				Hygrometer.		Rain.		Prevailing Wind.
	9.30 A.M.	3.30 P.M.	In Sun.	In Shade.			Dew Point.	Humidity.	On the Ground.	25 Feet above.	
			Max.	Max.	Mean.	Min.					
January - -	- - - - Observations not commenced.										
February - -	30·093	29·993	83·5	71·0	57·3	43·0	46·3	·705	3·59	6·31	N.W.
March - -	29·922	29·906	Thermometer unserviceable.	73·6	58·1	44·6	52·1	·784	7·02	12·10	N.W.
April - -	29·967	29·938		74·0	62·0	52·0	54·5	·721	2·82	2·71	N.W.
May - - -	29·992	29·944		80·5	66·0	49·0	57·0	·690	1·60	1·51	S.
June - -	30·030	29·996		83·5	70·4	57·0	60·5	·659	No rain.		S.
July - - -	29·982	29·945		90·8	75·1	61·8	65·2	·643	No rain.		N.W.
August - -	30·035	29·998		87·9	74·3	60·6	64·0	·666	·36	·36	S.
September - -	30·028	29·976		85·0	72·0	54·0	64·0	·707	·04	·01	N.W
October - -	30·030	29·986		81·6	68·6	55·6	61·2	·778	3·88	3·0	N.W.
November - -	30·020	29·973		69·8	62·9	44·0	57·4	·798	5·51	5·18	N.W.
December - -	30·170	30 ·122		66·3	57·0	43·5	52·6	·777	·06	·05	N.W.
Sums - -	330·270	329·747		863·4	724·4	576·5	634·8	7·888	24·80	31·23	—
Results - Max. -	30·093	30·022		90·8	75·1	61·8	65·2	·798	7·02	12·10	—
Results - Min.	29·967	29·906		66·3	57·0	43·0	46·3	·643	—	—	—
Results - Mean -	30·025	29·977		78·5	65·9	51·4	57·7	·717	—	—	N.W.

February.—5th, gale of wind from W. and E.; pressure 14 lbs.; barometer about 29·7. 25th, severe thunderstorm between 2.30 and 3.30 A.M.; wind N.N.W.

March 6th. Severe gale with tremendous sea; wind E.; pressure 7 lbs.; tide 2′ 6″ above high water; barometer about 29·7.

April.—Pear trees in blossom, and fruit forming on the vine.

February and *November* were the most rainy months. The total amount of rain in the upper pluviometer for year was 31·23 inches.

NOTE.—Greatest height of the thermometer, 23rd *July*, 90·8°. Greatest fall, 24th and 25th *February*, 43·0°. Mean temperature 65·8°. *July* was the hottest month.

Annual Register, compiled from the results of the Monthly Observations—*continued.*

1853.

Months.	Barometer.		Thermometer.				Hygrometer.		Rain.		Prevailing Wind.
	9.30 A.M.	3.30 P.M.	In Sun.	In Shade.			Dew Point.	Humidity.	On the Ground.	25 Feet above.	
			Max.	Max.	Mean.	Min.					
January	30·107	30·051	Thermometer unserviceable.	65·0	56·8	44·2	50·1	·763	4·53	4·14	N.W.
February	29·839	29·798		65·0	51·5	39·5	42·8	·735	10·49	10·19	N.W.
March	30·058	30·012		70·0	56·5	41·2	46·1	·683	2·51	2·44	N.W.
April	30·024	29·982		78·2	59·0	47·2	54·2	·713	1·32	1·30	N.W.
May	29·900	29·879		82·2	62·7	51·2	54·0	·717	6·48	6·30	S.W.
June	30·034	30·010		86·0	68·9	54·5	59·8	·655	0·07	0·07	N.W. & S.W.
July	30·057	29·984		88·0	74·5	61·2	66·4	·695	No rain.		N.W.
August	29·959	29·918		91·6	77·8	65·2	68·3	·672	No rain.		N.W. & S.W.
September	29·999	29·958		84·6	73·3	60·8	65·4	·727	1·24	1·23	N.W.
October	30·029	29·982		84·3	66·1	50·9	58·4	·747	2·59	2·55	N.W.
November	29·983	29·940		71·3	57·7	46·7	53·0	·760	5·56	5·45	N.W.
December	29·874	29·841		66·4	54·8	32·7	48·0	·793	11·94	11·73	N.W.
Sums	359·862	356·455		942·6	759·6	596·3	666·5	8·660	46·73	45·40	—
Results – Max.	30·107	30·051		91·6	77·8	65·2	68·3	·793	11·94	11·73	—
Min.	29·839	29·798		65·0	51·5	32·7	42·8	·655	—	—	—
Mean	29·988	29·955		78·5	63·3	49·7	55·5	·721	—	—	N.W.

April 9th.—A moderate gale from N.W.; barometer, 30·156.
May.—Unusually cold and damp for the season.
August.—23rd to 31st, comet visible in the N.W.
September.—2nd and 15th, thunder.
December.—31st, ice, ¼″ thick; snow on opposite hills; minimum temperature, 32° 7.

February and *December* were the most rainy months. The total amount of rain during the year in the upper pluviometer was 45·40 inches.

August was the hottest, and *February* the coldest month.

Note.—Greatest height of the thermometer, 18th *August*, 91·6°. Greatest fall, 31st *December*, 32·7°. Mean temperature, 63·3°. A comet was clearly visible between 7.30 and 9.30 p.m. from 23rd to 31st of August. On the 24th its right ascension was about 11h. 40m. and its declination 27° N., as taken from observed distances from fixed stars. On the 31st its right ascension was 11h. 19m., and its declination 16° 30′ N.; it set about 12 minutes earlier every evening, its path being inclined to the ecliptic about 61°. The appearance of the nucleus was about equal to that of a star of the second magnitude.

1854.

Months.	Barometer.		Thermometer.				Hygrometer.		Rain.		Prevailing Wind.
	9.30 A.M.	3.30 P.M.	In Sun.	In Shade.			Dew Point.	Humidity.	On the Ground.	25 Feet above.	
			Max.	Max.	Mean.	Min.					
January	30·110	30·061	Thermometer unserviceable.	65·9	54·6	37·9	47·0	·754	5·08	4·44	S.W.
February	30·177	30·132		68·1	55·8	35·3	46·0	·698	1·55	1·52	N.W.
March	30·237	30·185		72·5	58·2	46·7	51·5	·774	2·43	2·36	N.W.
April	30·030	29·998		74·6	60·8	50·4	55·8	·857	6·35	6·22	N.W.
May	29·983	29·979		80·5	66·0	53·2	59·0	·720	1·19	1·03	N.W.
June	30·023	30·002		88·5	68·5	55·2	61·9	·801	1·21	1·11	S.W.
July	29·993	29·962		87·3	74·0	62·0	66·4	·699	No rain.		S.
August	29·972	29·907		89·0	76·4	61·5	71·3	·797	1·70	1·72	N.W.
September	30·095	30·035		84·0	73·1	60·8	69·0	·852	1·81	1·76	N.W.
October	30·068	30·043		84·0	67·6	52·0	60·5	·754	·48	·36	N.W.
November	29·944	29·959		71·5	58·7	43·8	52·3	·779	16·49	12·46	N.W.
December	30·233	30·194		64·5	54·7	45·0	43·5	·694	·03	·03	N.W.
Sums	360·866	360·457		930·4	768·4	603·8	684·2	9·179	38·32	33·01	—
Results – Max.	30·237	30·194		89·0	76·4	62·0	71·3	·857	16·49.	12·46	—
Min.	29·945	29·907		64·5	54·6	35·3	43·5	·694	—	—	—
Mean	30·072	30·038		77·5	64·0	50·3	57·0	·765	—	—	N.W.

February 14th.—Hurricane during the morning.
November 18th.—Snow on the Spanish mountains.

Note.—*August* was the hottest month, and *January* the coldest. *January* and *November* were the most rainy months. Greatest height of the thermometer, *August*, 89·0°. Greatest fall of the thermometer, *February*, 35·3°. Mean temperature, 64·0°. Total amount of rain in upper pluviometer, 33·01 inches.

ANNUAL REGISTER, compiled from the results of the Monthly Observations—*continued.*

1855.

Months.	Barometer.		Thermometer.				Hygrometer.		Rain.		Prevailing Wind.
	9.30 A.M.	3.30 P.M.	In Sun. Max.	In Shade. Max.	In Shade. Mean.	In Shade. Min.	Dew Point.	Humidity.	On the Ground.	25 Feet above.	
January - -	30·081	30·050	Thermometer unserviceable.	65·0	54·0	40·3	45·5	·736	7·31	2·82	N.W.
February - -	29·904	29·845		70·4	57·8	47·2	49·6	·763	12·81	11·47	S.W.
March - -	29·985	29·946		70·0	57·8	44·7	48·0	·700	7·34	6·89	S.W.
April - -	29·984	29·951		77·0	61·3	47·9	52·4	·700	2·31	1·83	S.
May - - -	29·951	29·933		77·7	63·0	50·8	58·5	·713	5·12	4·48	N.W. & S.W.
June - -	30·044	30·210		84·2	67·9	48·6	58·4	·673	11·3	11·00	N.W.
July - - -	29·955	29·923		91·2	74·3	63·4	65·1	·687	·01	·00	E.
August - -	29·989	29·948		90·5	76·1	62·8	67·6	·712	1·60	1·50	E.
September - -	30·066	30·001		79·9	69·6	59·6	64·9	·767	5·046	4·04	E.
October - -	30·052	30·016		82·1	67·9	53·5	59·6	·745	7·20	7·014	E.
November - -	29·856	29·811		67·8	58·0	48·2	52·0	·781	13·478	14·41	N.W.
December - -	29·922	29·876		67·5	56·4	46·2	51·0	·800	18·05	20·09	N.W.
Sums - -	359·789	359·510		923·3	754·3	613·2	672·6	8·774	75·84	69·35	—
Results - Max. -	30·081	30·050		91·2	76·1	63·4	67·6	·800	—	—	—
Results - Min. -	29·856	29·811		65·0	48·2	40·3	45·5	·670	—	—	—
Results - Mean -	29·982	29·959		76·9	62·8	51·1	56·0	·731	—	—	N.W.

February.—12th, 4·63 inches rain fell. 13th, Barometer, at 3·30 p.m., 29·9.

May.—More rain this season (57·9 inches) than any year since 1796.

Note.—*July* was the hottest month and *November* the coldest. *February, November,* and *December* were the most rainy months. Greatest height of the thermometer, *July,* 91·2°. Greatest fall of the thermometer, *January,* 40·3. Mean temperature of the year, 62·8°. Total amount of rain in upper pluviometer, 69·35 inches.

1856.

Months.	Barometer.		Thermometer.				Hygrometer.		Rain.		Prevailing Wind.
	9.30 A.M.	3 30 P.M.	In Sun. Max.	In Shade. Max.	In Shade. Mean.	In Shade. Min.	Dew Point.	Humidity.	On the Ground.	25 Feet above.	
January - -	29·829	29·760		67·0	56·0	47·7	50·9	·798	21·624	20·385	N.W.
February - -	30·023	29·979		68·1	55·4	46·0	50·5	·777	7·267	7·778	E.
March - -	29·875	29·845		71·2	57·6	49·0	52·6	·783	4·78	3·23	E.
April - -	30·057	30·024	89·0	73·5	61·1	49·7	52·7	·743	2·52	1·43	N.W.
May - - -	30·041	29·974		84·2	67·1	54·0	57·1	·679	·30	·15	N.W.
June - -	30·015	30·045	Thermometer unserviceable.	82·0	69·6	56·6	62·3	·751	·18	·6	E.
July - - -	30·014	29·980		86·9	74·3	62·9	67·0	·721	No rain.		E.
August - -	29·999	29·964		92·0	76·4	65·0	68·7	·725	·26	·14	E.
September - -	30·029	29·996		88·7	71·8	55·9	63·0	·722	·115	·23	N.W.
October - -	30·123	30·092		79·4	65·9	55·0	59·4	·764	3·41	2·97	E.
November - -	30·078	30·033		72·9	59·7	45·3	50·8	·717	2·45	2·42	E.
December - -	30·121	30·084		71·9	56·7	44·0	47·7	·699	2·24	2·73	N.W.
Sums - -	360·201	359·776		937·8	771·6	631·1	682·7	8·879	42·54	51·55	—
Results - Max. -	30·123	30·092		92·0	76·4	65·0	68·7	·798	21·624	20·385	—
Results - Min. -	29·829	29·760		71·2	55·4	44·0	47·7	·679	—	—	—
Results - Mean -	30·019	29·981		78·1	64·3	52·6	56·9	·739	—	—	E.

January.—Most rain ever recorded in one month at Gibraltar.

December 26th.—Gale of wind accompanied by rain at 9½ a.m. ; barometer, 29·6 ; wind W., pressure, 10lbs. The wind veered round during the morning to S.W., again at 2 p.m. to N.W. ; 3½ p.m., barometer, 29·55 ; wind N.W., and its pressure 20·25 lbs. At 4 p.m. the gale abated.

Note.—*August* was the hottest month and *February* the coldest. *January* and *February* were the most rainy months. Greatest height of the thermometer, *August,* 92·0°. Greatest fall of the thermometer, *December,* 44·0°. Mean temperature of the year, 64·3°. Total amount of rain in upper pluviometer, 51·55 inches.

ANNUAL REGISTER, compiled from the results of the Monthly Observations—*continued.*

1857.

Months.	Barometer.		Thermometer.				Hygrometer.		Rain.		Prevailing Wind.
	9.30 A.M.	3.30 P.M.	In Sun.	In Shade.			Dew Point.	Humidity.	On the Ground.	25 Feet above.	
			Max.	Max.	Mean.	Min.					
January - -	30·059	30·012	Thermometer unserviceable.	65·2	58·7	50·2	41·9	·680	1·715	1·746	W.
February - -	29·982	29·954		66·1	54·5	42·2	46·0	·741	6·924	5·563	E.
March - -	30·061	30·025		69·9	57·4	45·8	49·3	·704	2·425	3·438	W.
April - -	30·021	29·962	92·3	78·7	60·1	49·3	51·3	·695	·401	·460	N.W.
May - - -	29·988	29·963	94·2	79·1	62·4	50·8	56·4	·698	2·710	2·543	E. & W.
June. - -	30·056	30·034	128·3	84·7	69·4	57·8	59·9	·657	·680	·900	E.
July - - -	30·087	30·057	113·2	93·4	75·4	62·2	65·5	·704	No rain.		E.
August - -	29·981	29·956	107·3	92·2	75·6	61·6	65·7	·699	·438	·440	F.
September - -	30·076	30·040	100·8	87·3	72·6	53·7	63·2	·683	·695	·385	E.
October - -	30·012	29·979	101·5	81·4	71·3	53·9	58·6	·757	2·365	1·762	E.
November - -	29·987	29·946	94·1	69·8	62·1	44·6	55·6	·799	6·528	6·756	E.
December - -	30·307	30·263	83·9	68·4	59·1	48·3	47·9	·644	1·644	1·499	E.
Sums - -	360·617	360·191	—	936·2	778·6	620·4	666·3	8·481	26·495	24·492	—
Results - Max. -	30·307	30·263	128·3	93·4	75·6	62·2	65·7	·799	6·924	5·563	—
Results - Min. -	29·981	29·946	—	65·2	54·5	42·2	41·9	·654	—	—	—
Results - Mean -	30·051	30·016	—	78·2	64·8	51·7	55·1	·707	—	—	E.

January 31*st.*—Ice at the Orange Bastion.

July.—7th and 8th, very hot and sultry, owing to large fires on the hills to the westward ; the thermometer has never been so high in the shade (93·4°) since this observatory has been established.

August.—2nd, Heavy flashes of lightning, and thunder at a distance ; 12th, heavy squalls during night ; 20th, heavy rain, accompanied by hail and lightning.

October 28*th.*—Gale of wind during the night, lightning.

November 28*th.*—A thunderstorm came on at about 4.30 p.m., it abated at about 5 p.m., and came on again at about 8 p.m., when it lasted till 12, the wind blowing a gale.

Note.—*July* and *August* were the hottest months, and *February* the coldest. *February* and *November* were the most rainy months. Greatest height of the thermometer in the shade, *July,* 93·4°. Greatest fall of the thermometer in the shade, *February,* 42·2°. Greatest height of the thermometer in the sun, *June,* 128·0°. Mean temperature of the year, 64·8°. Total amount of rain in the upper pluviometer 24·492 inches.

1858.

Months.	Barometer.		Thermometer.				Hygrometer.		Rain.		Prevailing Wind.
	9.30 A.M.	3.30 P.M.	In Sun.	In Shade.			Dew Point.	Humidity.	On the Ground.	25 Feet above.	
			Max.	Max.	Mean.	Min.					
January - -	30·221	30·173	63·5	58·6	54·4	50·3	42·9	·662	9·044	9·492	E.
February - -	29·953	29·926	70·8	61·1	56·0	50·9	46·3	·733	9·440	9·395	W.
March - -	30·000	29·983	80·0	63·9	58·0	52·2	47·5	·715	6·330	7·190	E.
April - -	30·040	29·999	92·4	72·9	65·1	57·4	53·1	·658	0·038	0·000	E.
May - - -	30·031	30·009	96·1	76·3	67·4	58·4	52·0	·575	0·491	0·190	E.
June - -	29·969	29·963	107·4	81·7	73·4	65·1	58·1	·567	0·060	0·070	E.
July - -	29·982	29·948	110·0	84·1	75·7	67·2	61·9	·599	No rain.		E.
August - -	29·956	29·927	104·9	84·9	76·9	69·0	65·2	·656	0·508	0·416	E.
September - -	30·041	30·006	94·0	81·2	72·5	63·7	66·1	·705	4·040	2·005	E.
October - -	29·974	29·936	83·6	73·2	67·7	62·1	57·4	·719	6·800	10·010	E.
November - -	29·851	29·810	73·5	68·0	64·3	60·6	54·9	·739	24·330	29·223	W.
December - -	30·206	30·162	73·7	62·1	57·4	52·6	43·8	·614	2·615	2·630	N.W.
Sums - -	360·224	359·842	1,049·9	868·0	788·8	710·5	649·2	7·942	63·739	70·621	—
Results - Max. -	30·221	30·173	110·0	84·9	76·9	69·0	66·1	·739	24·330	29·223	E.
Results - Min. -	29·815	29·810	63·5	58·6	54·4	50·3	42·9	·567	—	—	—
Results - Mean -	30·019	29·987	87·5	72·3	64·1	59·2	54·1	·662	—	—	—

January 29*th* and 30*th.*—Thunderstorm, heavy squalls and heavy rain.

March 6*th.*—Thunder and lightning and heavy gale; barometer, 29·089.

May 6*th.*—Thunderstorm ; a large waterspout burst in N.W.

July 5*th.*—A heavy gale from the north.

Note.—*July* and *August* were the hottest months, and *January* the coldest. *January* and *November* were the most rainy months. Mean temperature for the year, 64·1°.

Annual Register, compiled from the results of the Monthly Observations—*continued.*

1859.

Months.	Barometer.		Thermometer.				Hygrometer.		Rain.		Prevailing Wind.
	9.30 A.M.	3.30 P.M.	In Sun. Max.	In Shade. Max.	In Shade. Mean.	In Shade. Min.	Dew Point.	Humidity.	On the Ground.	25 Feet above.	
January - -	30·282	29·928	69·8	60·0	55·1	50·2	42·7	·607	1·110	1·035	E.
February - -	30·168	30·118	71·5	60·4	56·1	51·9	42·5	·622	1·851	1·099	E.
March - -	30·158	30·103	77·1	65·3	59·1	52·9	46·0	·601	No rain.		E.
April - -	30·023	29·998	79·1	71·5	64·0	56·5	54·5	·693	2·854	3·060	W.
May - - -	29·927	29·892	80·2	75·8	66·5	57·2	56·5	·737	2·786	2·704	W.
June - -	30·030	29·999	81·7	78·8	61·1	69·9	61·3	·720	3·640	3·783	W.
July - - -	30·055	30·013	90·1	83·5	76·4	69·0	68·2	·750	No rain.		S.E.
August - -	29·962	29·923	93·1	86·1	77·7	69·3	68·3	·699	0·160	0·136	W.
September - -	30·029	29·990	91·6	82·0	74·1	66·2	65·7	·707	0·080	0·061	E.
October - -	29·939	29·955	82·2	72·4	66·1	59·9	59·2	·764	5·493	5·274	W.
November - -	30·103	30·056	75·1	65·5	61·0	56·5	54·0	·779	9·011	8·871	W.
December - -	30·076	30·004	69·7	61·1	57·6	52·1	49·0	·765	8·870	8·830	E.
Sums - -	360·752	359·979	961·2	863·4	774·8	711·6	667·9	8·444	35·855	34·853	—
Results - Max. -	30·282	30·118	93·1	86·1	77·7	69·9	68·3	·779	9·011	8·871	—
Results - Min. -	29·927	29·892	69·7	60·1	55·1	50·2	42·5	·601	0·080	0·060	—
Results - Mean -	30·063	29·998	80·1	71·9	64·6	59·3	55·7	·704	—	—	W.

Note.—*August* was the hottest month, and *January* the coldest. *November* and *December* were the most rainy months. Mean temperature for the year, 64·6°.

1860.

Months.	Barometer.		Thermometer.				Hygrometer.		Rain.		Prevailing Wind.
	9.30 A.M.	3.30 P.M.	In Sun. Max.	In Shade. Max.	In Shade. Mean.	In Shade. Min.	Dew Point.	Humidity.	On the Ground.	25 Feet above.	
January - -	30·165	30·109	70·1	61·4	56·6	51·8	50·1	·794	6·560	6·378	W.
February - -	30·062	30·024	66·8	56·5	50·7	44·9	41·3	·704	0·892	0·857	N.W.
March - -	30·092	30·027	69·5	62·6	57·7	52·8	51·7	·778	2·357	2·134	E.
April - -	29·939	29·912	73·6	66·8	60·5	54·1	55·5	·775	6·356	6·631	N.W.
May - - -	29·978	29·958	82·9	77·1	68·5	59·9	62·5	·736	No rain.		E.
June - -	29·981	29·957	88·6	81·6	71·9	62·1	63·9	·709	0·302	0·063	W.
July - - -	29·953	29·927	92·0	84·2	76·0	67·8	65·9	·704	0·013	0·008	E.
August - -	29·957	29·921	92·1	83·3	76·1	68·9	67·1	·733	0·048	0·030	E.
September - -	30·000	29·960	87·0	78·0	69·9	61·7	59·9	·706	1·027	0·425	N.W.
October - -	30·112	30·070	82·5	72·9	67·6	62·3	60·1	·793	0·047	0·017	E.
November - -	29·961	29·919	79·3	69·4	63·6	57·8	58·7	·809	9·528	9·047	N.W.
December - -	29·999	29·963	72·4	64·3	59·4	54·4	53·0	·823	7·469	6·768	W.
Sums - -	360·199	359·747	956·8	858·1	778·5	698·5	689·7	9·064	34·599	32·358	—
Results - Max. -	30·165	30·109	92·1	84·2	76·1	68·9	67·1	·823	9·528	9·047	—
Results - Min. -	29·939	29·912	66·8	56·5	50·7	44·9	41·3	·704	—	—	—
Results - Mean -	30·017	29·979	79·7	71·5	64·9	58·2	57·4	·755	—	—	—

January.—A strong gale from east from the 7th to the 10th.

February.—This month was unusually cold, the min. on the grass being 27·5°. Ice collected on various parts of the rock.

September.—Violent squalls on the night of the 12th, and morning of the 13th.

October.—Easterly winds very prevalent this month.

December.—The first few days of this month a remarkable calm prevailed, followed by a gale of wind on the 10th, from which day until the end of the year westerly winds accompanied by south-westerly gales were prevalent.

Note.—The hottest month in the shade was *July*, greatest heat on the 17th, 92·2°; the coldest month in the shade was *February*, least heat on the 15th, 32·6°. Mean temperature for the year, 64·9°. Rain fell on 92 days; greatest quantity collected in 24 hours, 5·245 in.; *November* and *December* were the most rainy months.

MEANS of OBSERVATIONS taken between February 1852 and September 1861, both Months inclusive.

Months.	Barometer Means at 93.0 A.M. and 3.30 P.M.	Mean Temperature.	Mean Rain. On the Ground.	Mean Rain. 25 Feet above.	Prevailing Winds.	Remarks.
	ins.	°	ins.	ins.		
January - -	30·056	55·5	7·070	6·279	E. and N.W.	
February -	30·007	55·1	6·167	6·099	N.W.	
March - -	30·029	58·1	3·752	4·226	E. and N.W.	
April - -	29·997	61·5	2·653	2·513	N.W.	
May - -	29·958	65·5	2·419	2·227	E. and W.S.W	
June - -	30·019	70·1	1·745	1·761	E.	
July - -	29·988	75·0	0·003	0·001	E.	
August - -	29·965	76·5	0·511	0·477	E.	
September -	30·017	72·3	1·444	1·047	E. and N.W.	
October - -	30·022	67·4	3·595	3·662	E. and N.W.	
November -	29·958	60·9	10·320	10·424	N.W.	23 inches of rain fell in Dec. 1861. When this is included in the means, the average quantity of rain for December will be about 8 inches.
December -	30·079	57·0	5·879	6·039	N.W.	

ABSTRACT showing the ANNUAL AMOUNT of RAIN collected at GIBRALTAR between the Years 1790 and 1860; also the TOTAL AMOUNT and MEAN during those Years.

Years.	Amount.	Years.	Amount.	Years.	Amount.	Years.	Amount.	Years.	Amount.	Years.	Amount.	25 Feet above Ground.
1790–1	29·090	1802–3	42·640	1814	27·050	1826	28·190	1838	50·830	1850	32·270	——
1791–2	44·050	1803–4	50·910	1815	36·700	1827	25·990	1839	30·220	1851	22·120	——
1792–3	19·080	1804–5	30·610	1816	25·240	1828	21·500	1840	37·350	1852	28·750	——
1793–4	22·360	1805–6	39·450	1817	26·690	1829	61·150	1841	21·100	1853	46·730	45·400
1794–5	21·560	1806–7	29·690	1818	30·940	1830	26·690	1842	22·200	1854	38·320	33·010
1795–6	25·640	1807–8	33·010	1819	23·580	1831	42·900	1843	23·880	1855	75·840	69·350
1796–7	64·600	1808–9	31·220	1820	37·320	1832	18·940	1844	44·300	1856	42·540	51·550
1797–8	30·500	1809–0	37·360	1821	30·090	1833	26·730	1845	35·980	1857	26·495	24·492
1798–9	31·190	1810–1	27·684	1822	18·010	1834	42·250	1846	21·460	1858	64·144	70·621
1799–0	42·210	1811–2	40·370	1823	25·490	1835	32·060	1847	25·320	1859	35·855	34·853
1800–1	15·120	1812	47·020	1824	17·040	1836	13·660	1848	27·560	1860	34·599	32·358
1801–2	29·490	1813	31·630	1825	29·390	1837	33·790	1849	28·370			

Total Amount, 2,329·153 inches. Mean, 32·809 inches.

BENJ. S. STEHELIN, Colonel C. R.E.

No. 2.

RETURN of MORTALITY in the NORTH DISTRICT of GIBRALTAR during the Year 1860, showing the AGES and CAUSES of DEATH.

Diseases.	Under 1 Year.		From 1 to 5 Years.		From 5 to 10 Years.		From 10 to 15 Years.		From 15 to 20 Years.		From 20 to 30 Years.		From 30 to 40 Years.		From 40 to 50 Years.		From 50 to 60 Years.		From 60 to 70 Years.		From 70 to 80 Years.		Total.	
	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.
Ascites - - -	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	1
Asthma - - -	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2	–	2	1	3	2	–	1	7	4
Anemia - - -	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	1	–
Apoplexy - - -	–	–	–	–	–	–	–	–	–	–	–	–	1	3	1	1	1	1	2	1	4	2	9	8
Abscess - - -	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	1	–
Accidental - - -	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	1	–
Bronchitis - - -	–	–	1	–	–	–	–	–	–	–	–	–	–	–	1	1	–	–	1	–	–	–	3	1
Brain fever - - -	2	1	3	8	1	1	–	1	–	–	–	–	–	1	–	1	–	–	–	–	–	–	6	13
Consumption - - -	1	–	3	2	–	–	–	–	–	1	6	14	9	9	7	7	1	2	2	2	–	2	29	39
Convulsions - - -	9	6	7	9	1	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	18	16
Cancer - - -	–	–	–	–	–	–	–	–	–	–	–	–	–	1	2	–	2	–	–	1	1	–	5	2
Croup - - -	2	1	3	2	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	5	4
Chronic disease of bowels -	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	1	1	1
Congestion of brain - -	–	–	–	–	–	–	–	–	–	–	1	–	1	–	–	–	–	–	–	1	–	–	2	1
Child-birth - - -	–	–	–	–	–	–	–	–	–	–	–	2	–	1	–	2	–	–	–	–	–	–	–	5
Catarrh - - -	3	3	2	7	–	1	–	–	–	–	–	–	–	1	–	–	–	–	2	1	1	–	8	13
Cystitis - - -	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	1	–
Chronic anæmia - -	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	1
Cerebritis - - -	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	1	–
Cholera - - -	–	–	2	1	–	–	–	–	–	3	1	5	7	3	1	3	2	2	5	1	2	–	20	18
Diarrhœa - - -	1	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	1	–	3	–
Dyspepsia - - -	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	1	–
Dysentery - - -	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Dropsy - - -	–	–	–	2	–	1	1	–	1	–	–	1	–	–	–	5	–	1	3	–	1	–	6	10
Erysipelas - - -	–	1	–	–	–	–	–	–	–	–	1	–	–	1	–	–	–	–	1	–	–	–	2	2
Effusion of brain - -	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–
Epilepsy - - -	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Fracture - - -	–	–	1	–	–	–	–	–	1	–	1	–	–	–	–	–	1	–	–	–	–	–	4	–
Fistula - - -	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	1
Fever - - -	2	1	–	1	–	–	1	–	–	–	–	–	–	1	1	–	–	–	–	–	–	–	4	3
Gastritis - - -	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	1	–
Gangrene - - -	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	1	–	–	–	–	–	–	1	1
Gastralgia - - -	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	1	–
Hooping cough - -	–	1	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2
Hæmatemesis - -	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	1

Return of Mortality in the North District of Gibraltar during the year 1860—*continued.*

Diseases.	Under 1 Year.		From 1 to 5 Years.		From 5 to 10 Years.		From 10 to 15 Years.		From 15 to 20 Years.		From 20 to 30 Years.		From 30 to 40 Years.		From 40 to 50 Years.		From 50 to 60 Years.		From 60 to 70 Years.		From 70 to 80 Years.		Total.	
	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.
Hæmoptysis	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	1	–
Hernia	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	1	–
Heart disease	–	–	–	–	–	–	1	–	–	–	–	1	–	1	1	–	–	2	–	–	–	2	2	6
Inflammation of lungs	1	2	–	–	–	–	–	–	–	–	1	1	–	1	–	–	–	–	–	–	–	–	2	4
In infancy from weakness	8	10	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	8	10
Inflammation of bowels	1	1	1	2	–	–	–	–	–	–	–	1	–	1	–	–	–	–	–	1	–	–	2	6
Leprosy	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	1	–
Lock jaw	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	2	–
Liver complaint	–	–	–	–	–	–	–	–	–	–	–	–	–	1	1	–	–	–	–	–	–	1	1	2
Larynx, disease of	–	–	–	1	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	1	–	2	1
Mumps	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Mortification	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	1	–	1	1	–	–	2	2
Marasmus	2	3	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2	3
Meningitis	–	–	–	1	1	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2	1
Measles	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1
Mania	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	1	–
Nervous affection	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	1
Old age	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	23	25	23	25
Peritonitis	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	1	–
Pneumonia	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	1	–	–	1	2	–	–	2	3
Paralysis	–	–	–	–	–	–	–	–	–	–	1	–	–	–	1	–	–	–	2	3	4	1	8	4
Parotitis	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	1	–
Quinsey	1	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2	–
Rheumatism	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	1	–	–	–	2	–
Scarlet fever	–	–	2	1	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	3	1
Syphilis	1	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	2
Small pox	1	1	7	4	5	2	–	–	–	1	3	1	–	–	2	–	–	–	–	–	–	–	18	9
Spasms	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	1	–
Suddenly	–	1	–	–	–	–	–	–	1	–	–	1	1	–	1	1	–	–	–	–	–	–	3	3
Teething	7	8	8	4	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	15	12
Typhus	–	–	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2	–
Ulcers	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–
Water in brain	–	1	3	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	3	2
	44	43	46	46	10	9	4	1	4	5	19	28	23	28	27	23	13	10	28	17	39	35	257	245

Births in Gibraltar in the year 1860.

Males	309
Females	281
Total	590

RETURN of MORTALITY in the SOUTH DISTRICT of GIBRALTAR during the Year 1860, showing the AGES and CAUSES of DEATH.

Diseases.	Under 1 Year.		From 1 to 5 Years.		From 5 to 10 Years.		From 10 to 15 Years.		From 15 to 20 Years.		From 20 to 30 Years.		From 30 to 40 Years.		From 40 to 50 Years.		From 50 to 60 Years.		From 60 to 70 Years.		From 70 to 80 Years.		Total.	
	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.
Apoplexy	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	1
Brain fever	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–
Consumption	–	–	–	–	–	–	1	–	–	–	1	2	–	–	–	–	–	–	–	–	–	–	2	2
Convulsions	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–
Cancer	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	1	–
Child-birth	–	–	–	–	–	–	–	–	–	–	–	2	–	–	–	–	–	–	–	–	–	–	–	2
Cholera	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	1	–
Diarrhœa	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–
Dysentery	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	1	–
Dropsy	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	1	–
Epilepsy	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	1	–
Fever	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	1
Heart disease	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	1
Inflammation of lungs	1	–	1	–	–	1	–	–	–	–	–	–	–	–	1	–	–	1	1	–	–	–	4	2
In infancy from weakness	1	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	2
Inflammation of bowels	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	1	–
Liver complaint	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	1
Mumps	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–
Old age	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	4	3	4	3
Small pox	–	–	–	1	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	1	1
Spasms	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1
Suddenly	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2	–	–	–	–	–	–	–	2
Teething	–	3	–	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	5
	3	5	4	4	–	1	1	–	–	–	3	5	3	–	1	3	1	2	1	1	5	3	22	24

Police Office, 26th September 1861.

FRED. MIDDLETON,
Acting Police Magistrate.

No. 3.

ABSTRACT showing the SICKNESS and DEATHS among the INDIGENT POOR of GIBRALTAR for the Year ending 31st December 1860.

Class.	Order.	Diseases.	Admitted.	Died.
I.	1	Variola	62	1
„	„	Varicella	3	—
„	„	Morbilli	6	—
„	„	Scarlatina	10	—
„	„	Tonsillitis	22	—
„	„	Parotitis	11	—
„	„	Cynanche Trachealis	2	—
„	„	Pertussis	6	—
„	„	Febris Typhoides	4	—
„	„	„ Typhus	4	—
„	„	„ Intermittens	9	—
„	„	„ Continua	180	3
„	„	Ophthalmia	36	—
„	„	Erysipelas	25	—
„	„	Metria	119	—
„	„	Anthrax	3	—
„	„	Furunculus	8	—
„	„	Dysentery	15	—
„	„	Diarrhœa	99	—
„	„	Cholera	68	10
„	„	Cholerina	25	—
„	„	Rheumatism	65	—
„	2	Syphilis Prim.	41	—
„	„	Gonorrhœa	13	—
„	„	Strictura Urethræ	1	—
„	3	Scorbutus	5	—
„	„	Ebriositas	1	1
„	4	Porrigo	3	—
„	„	Scabies	2	—
„	„	Vermes	7	—
II.	1	Podagra	1	—
„	„	Anæmia	3	—
„	„	Anasarca	18	2
„	„	Carcinoma	2	4 ?
„	„	Scirrhoma	1	—
„	„	Gangrena Senilis	3	1
„	2	Scrofula	3	—
„	„	Phthisis	39	11
„	„	Hæmoptysis	22	2
III.	1	Meningitis	6	2
„	„	Encephalitis	8	—
„	„	Apoplexia	14	6
„	„	Paralysis	10	2
„	„	Hemiplegia	3	—
„	„	Chorea	2	—
„	„	Delirium Tremens	11	—
„	„	Mania	5	1
„	„	Monomania	1	—
„	„	Dementia	4	—
„	„	Epilepsia	12	—
„	„	Hysteria	33	—
„	„	Tetanus	4	1
„	„	Convulsio	29	1
„	„	Eclampsia	1	—
„	„	Cephalæa	10	—
„	„	Neuralgia	19	—
„	„	Otitis	4	—
„	2	Carditis	7	—
„	„	Pericarditis	1	1
„	„	Aneurisma	2	—
„	„	Syncope	4	—
„	3	Epistaxis	2	—
„	„	Laryngitis	3	3
„	„	Bronchitis	129	2
„	„	Pleuritis	25	—
„	„	Hydrothorax	2	—
„	„	Pneumonia	51	—
„	„	Asthma	26	2
„	„	Angina Pectoris	1	—
„	4	Glossitis	1	—
„	„	Stomatitis	3	—
„	„	Gastritis	34	2
„	„	Enteritis	16	—
„	„	Peritonitis	2	1
„	„	Obstipatio	1	—
„	„	Hernia, Strang	7	—
„	„	„ Inguin.	1	—
„	„	Dyspepsia	12	—
„	„	Colica	78	—
„	„	Hæmatemesis	2	2
„	„	Hæmorrhois	4	—
„	„	Fistula in Ano	2	2
„	„	Hepatitis	9	—
„	„	Icterus	1	—
„	„	Ascites	7	3
„	„	Meteorismus	1	—
„	5	Nephritis	2	—
III.	5	Ischuria	4	—
„	„	Calculus Vesicæ	1	—
„	„	Hæmaturia	1	—
„	„	Cystitis	5	1
„	„	Fistula in Perinæo	1	—
„	6	Orchitis not Gonorrhœal	15	
„	„	Hydrops Ovarii	1	—
„	7	Arthritis	10	—
„	„	Exostosis	1	—
„	8	Urticaria	4	—
„	„	Eczema	8	—
„	„	Rupia	1	—
„	„	Ecthyma	1	—
„	„	Acne	1	—
„	„	Phlegmon	3	—
„	„	Abscessus	22	1
„	„	Paronychia	4	—
„	„	Ulcus	51	—
IV.	1	Dentitio	26	1
„	„	Tabes Mesenterica	1	—
„	2	Chlorosis	1	—
„	„	Partus (1), Abortus (7)	8	—
„	„	Paramenia	2	—
„	„	Menorrhagia	6	—
„	„	Metroperitonitis	1	—
„	„	Vaginitis	1	—
„	„	Hystralgia	1	—
„	„	Metritis	11	2
„	„	Prolapsus Uteri	4	—
„	3	Senectus	19	8
„	4	Asthenia	6	—
„	„	Atrophia	1	1
„	„	Plethora	3	—
V.	1	Ambustio	4	1
„	„	Luxatura	4	—
„	„	Subluxatio	11	—
„	„	Fractura	16	4
„	„	Contusio	55	—
„	„	Concussio Cerebri	2	—
„	„	Vulnus Sclop.	2	—
„	„	„ Incisum	20	—
„	„	Morsus Asini	1	—
		Total	1,889	85

JOHN PAYNTER,
Deputy Inspector-General of Hospitals.

Principal Medical Officer's Office,
Gibraltar, 5th November 1861.

No. 4.

EXTRACT from INSPECTIONAL REPORT, dated Gibraltar, 31st January 1861.

CISTERNS and AQUEDUCTS.

Name and Situation.	Quantity of Water they will contain.
	Gallons.
Officers' Quarters, No. 1, Castle - (2)	11,766
Do. do. 2 & 3 do. (3)	28,340
Do. do. 26 do.	6,125
Do. do. 28 do.	16,625
Castle Barracks	46,125
Officers' Quarters, Castle Road - (2)	5,691
Provost, Moorish Castle	7,684
Commanding Royal Engineer's Quarters - (3)	14,201
Officers' Quarters, Bell Lane	24,360
Commanding Officer of Artillery's Quarters - (2)	6,371
Barrackmaster's Store, Town Range	3,501
Engineer Building, Prince Edward's Rampart	17,900
Town Range Tanks { North	54,791
Town Range Tanks { South	63,336
Stanley's Buildings	13,728
Officers' Quarters { No. 26.	6,125
Officers' Quarters { „ 39.	10,771

Cisterns and Aqueducts—*continued.*

Name and Situation.	Quantity of Water they will contain.
Commissariat Bakery - - -	39,511
Transport Yard - - -	43,688
Senior Commissariat Officer's Quarters -	11,709
Quarters, Paradise Row - -	3,790
Royal Engineer's Barracks - -	20,304
Ditto ditto Surface -	22,000
Officers' Quarters, No. 15 - -	6,250
Gunner's Barrack - - -	33,371
Royal Artillery Mess House, Governor's Parade - - - -	21,725
Spanish Pavilion - - -	47,644
Officers' Quarters, No. 33 - -	21,900
Assistant Commissary-General's Quarters - - - -	*
King's Yard - - - -	46,125
F. O. Quarters, Southport Street (Iron)	5,000
Chaplain's Quarters, No. 6 - -	7,500
Clerk of Works' Quarters, Southport Street - - - -	12,155
Grand Store Yard, Military Store -	273,600
Storekeeper's Quarters, Bomb House Lane - - - -	11,288
Surgeon's Quarters, ditto - -	3,365
Principal Medical Officer's Quarters, ditto - - - -	7,200
Officers' Quarters, No. 17 - -	3,259
Officers' Mess House, near King's Bastion	84,700
Deputy Storekeeper's Quarters - -	14,900
City Mill Lane - - - -	16,968
Grand Casemates - - -	191,250
Wellington Front, 5 compartments -	125,860
Officers' Casemates, Waterport - -	127,500
Signal Station, Upper - - -	19,300
Jumper's Bastion - - -	52,000
New Mole Fort - - -	13,382
South Barrack Tank - - -	134,613
Ditto ditto - - -	208,188
Naval Hospital, No. 1, North end -	50,000
Ditto „ 2, South end -	56,000
Ditto Asylum - - -	6,500
F. O. Quarters, and No. 43, sheds adjoining - - - -	50,000
Ditto, No. 38, No. 1. - - -	6,015
Ditto, „ 38, „ 2. - - -	7,700
Between Officers' Quarters, No. 40 and 41	21,937
Viney's Cottage - - -	5,906
F. O. Quarters, Europa Pass - -	7,928
Military Prison, Windmill Hill - -	61,150
Officers' Barracks ditto - -	103,950
Soldiers' ditto ditto No. 1 -	33,541
Ditto ditto „ 2 -	54,967
Fuze House ditto - -	139,538
Europa Hospital - - -	39,343
Defensible Barrack, Europa - -	68,137
Brewery ditto, ditto - -	132,656
Buena Vista Barrack - - -	70,000
F. O. Quarters, Europa Pass - -	3,500
Europa New Huts - - -	40,000
Infants' School - - - -	4,612
Officers' Quarters, No. 10 - -	3,500
Buena Vista, Officers' Quarters - -	62,212
Total -	3,061,177
Projected.	
Buena Vista Huts - - -	40,000
Ditto Gulley - - -	1,500,000
Moorish Castle - - -	1,500,000
Commissariat Stores - - -	25,000
Total -	3,065,000

* A larger tank projected.

Royal Engineer Office, Gibraltar,
20th September 1861.

List of Wells in the Garrison of Gibraltar.

Where situated.	Imperial Gallons in one foot of depth.
Jumper's Bastion, Constant Spring -	—
Orange Bastion - - - -	60
Landport Ditch - - - -	240
Cornwall's Parade - - -	44
Casemate Barrack - - -	44
King Street, F. O. Quarters, No. 29 -	—
Line Wall, F. O. Quarters, No. 17 -	99
Casemate Pavilion - - -	—
King's Bastion - - - -	78
Town Range { Barrack - - -	44
Town Range { No. 1, Pavilion - -	—
F. O. Quarters, No. 10, near Cathedral -	—
Seud Hill - - - -	240
Ragged Staff - - - -	372
South Port Ditch - - -	372
Do. Noria - - -	2,820
Jumpers - - - - -	492
Upper Sandpit - - - -	396
Lower do. - - - -	396
South Barracks { Under Mess House - -	44
South Barracks { Mess House Garden - -	44
South Barracks { Rear of Barrack - -	99
South Barracks { Pavilion, No. 34 - -	72
Windmill Hill Fireproof Barracks -	240
Naval Hospital { Inside - -	66
Naval Hospital { Outside - -	176

List of Private Tanks in Gibraltar.

District.	No. of House.	No. of Tank.	Contents in Cubic Feet.	No. of Wells.
I.	1	—	—	1
„	2	1	1,130	—
„	„	2	1,130	—
„	3	—	—	1
„	4	—	—	1
„	5	3	990	2
„	6	—	2,052	1
„	7	—	—	1
„	8	—	—	1
„	9	—	—	1
„	10	—	—	1
„	11	—	—	1
„	12	—	—	1
„	13	4	3,120	1
„	14	5	2,520	1
„	17	6	1,300	1
„	18	—	—	1*
„	19	—	—	1
			12,242	
II.	1	—	—	1
„	2	1	791	1
„	4	2	1,060	—
„	5 & 6	3	1,589	—
„	7	4	1,176	—
„	8	5	5,292	1
„	9	6	2,400	—
„	12	7	1,203	—
„	18	8	1,600	—
„	„	9	720	—
„	21	10	365	—
„	22	11	891	—
„	23	12	2,255	—
„	26	13	1,083	—
„	„	14	1,083	—

* Closed up.

List of Private Tanks—*continued.*

District.	No. of House.	No. of Tank.	Contents in Cubic Feet.	No. of Wells.
II.	28	15	552	—
”	30	16	1,540	—
”	31	17	810	—
”	33	18	2,400	—
”	35	19	1,575	—
”	36	20	2,640	—
”	37	21	920	—
”	38	22	972	—
”	39	23	1,012	—
”	43	24	983	—
”	44	25	1,404	—
”	45	26*	—	—
”	46	27	456	—
”	47	28	578	—
”	48	29	1,260	—
”	49	30	1,417	—
			40,027	
III.	1	—	—	1
”	”	—	—	1
”	2	1	1,582	1
”	3	2	1,509	1
”	4	3	1,155	1
”	5	4	1,848	1
”	6†	—	—	—
”	7 & 8	—	—	1
”	8	5	2,400	1
”	11	6	472	—
”	12	—	—	1
”	16	7	228	—
”	17 & 18	8	1,433	—
”	19	9	2,629	—
”	20	—	—	1
”	21	10	1,732	—
”	22	11	1,155	—
”	23	12	3,042	—
”	24	13	3,211	1
”	25	14	945	1
”	26	15	1,080	1
”	27	—	—	1
”	30	—	—	1
”	31	16	5,525	—
”	32	17	2,052	1
”	33	18	1,828	—
”	34	19	2,180	1
”	35	20	1,848	1
”	36	—	—	1
”	37	21	643	1
”	43	22	1,050	—
”	44	23	1,248	—
”	47	—	—	1
”	48	24	1,632	—
”	52	25	8,700	—
			51,122	
IV.	1	1	1,596	1
”	2	2	1,050	—
”	3	—	—	1
”	4	—	—	1
”	7	3	1,656	—
”	8	4	1,728	1
”	9	—	—	1
”	10	5	2,880	1
”	11	—	—	1
”	12	6	1,820	1
”	13	7	1,048	—
”	14	8	2,322	1
”	15	9	1,424	—
”	16	10	1,897	1

List of Private Tanks—*continued.*

District.	No. of House.	No. of Tank.	Contents in Cubic Feet.	No. of Wells.
IV.	17	11	1,620	1
”	18	12	2,117	1
”	19	13	2,916	1
”	20	14	2,048	1
”	21	15	1,995	1
”	22	16	2,970	1
”	23	17	2,394	—
”	24	18	2,376	1
”	26	19	3,367	1
”	27	—	—	1
”	28	—	—	1
”	29	—	—	1
			39,124	
V.	3	1	688	—
”	4	2	900	—
”	5	3	40	—
”	6	4	1,562	—
”	8	5	1,440	—
”	10	6	1,656	—
”	17	7	1,795	—
”	18	8	2,426	—
”	22	9	1,998	—
”	23	10	1,111	—
”	24	11	580	—
”	25	12	2,320	—
”	26	13	1,522	—
”	27	14	1,691	—
”	28	15	455	—
”	29	16	845	—
”	29	17	18,360	—
”	31	18	1,650	—
”	32	19	531	—
”	33	20	411	—
”	36	21	1,586	—
”	37	22	816	—
”	38	23	1,441	—
”	39	24	1,118	—
”	40	25	1,728	—
”	41	26	1,980	—
”	42	27	1,326	—
”	43	28	1,086	—
”	35	29	5,040	—
			58,132	
VI.	1	—	—	1
”	2	—	—	1
”	3	1	1,316	—
”	4	2	1,485	—
”	5	3	1,232	1
”	6	4	2,992	—
”	7	5	4,241	—
”	8	6	2,098	—
”	9	7	675	1
”	10	8	3,648	1
”	11	9	1,564	1
”	12	10	2,656	1
”	13	11	2,256	1
”	14	—	—	1
”	15	—	—	1
”	16	—	—	1
”	17	12	576	1
”	18	13	742	—
”	”	14	742	—
”	19	15	6,158	1
”	21	—	—	1
”	22	16	945	—
”	23	—	—	1
”	24	—	—	1
”	”	—	3,080	1
”	26	17	720	—
”	27	18	2,520	—
”	29	—	—	1

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* Tank not finished.

† Well supplied from No. 5.

List of Private Tanks—*continued.*

District.	No. of House.	No. of Tank.	Contents in Cubic Feet.	No. of Wells.
VI.	30	—	—	1
,,	32	—	—	1
			39,846	
VII.	1	1	2,088	—
,,	2	2	855	1
,,	3	—	—	1
,,	4	3	2,574	1
,,	5	—	—	1
,,	6	4	2,000	—
,,	7	5	2,815	1
,,	8	6	1,606	1
,,	9	—	—	1
,,	10	—	—	1
,,	11	—	—	1
,,	12	—	—	1
,,	14	7	2,300	—
,,	16	8	2,200	—
,,	17	9	3,500	—
,,	18	—	—	1
,,	19	10	1,368	1
,,	20	11	2,156	1
,,	21	12	900	—
,,	22	13	720	1
,,	23	14	2,160	1
,,	24	15	1,960	1
,,	25	16	767	1
,,	26	17	1,536	1
,,	27	18	1,400	1
			32,925	
VIII.	1	—	—	1
,,	2	—	—	1
,,	3	1	2,730	—
,,	4	2	1,282	1
,,	5	3	1,239	1
,,	6	4	1,075	—
,,	8	5	4,160	1
,,	9	6	2,000	—
,,	10	7	1,500	1
,,	12	8	431	1
,,	14	—	—	1
,,	16	9	3,040	—
,,	17	10	2,961	1
,,	18	—	—	1
,,	19	11	2,508	—
,,	20	12	900	—
			23,806	
IX.	1	1	1,200	1
,,	2	2	1,805	1
,,	3	—	—	1
,,	4	—	—	1
,,	5	—	—	1
,,	7	—	—	1
,,	8	—	—	1
,,	9	3	1,680	1
,,	10	—	—	1
,,	12	4	2,160	1
,,	13	5	1,800	—
,,	14	6	907	1
,,	16	7	2,382	—
			10,934	
X.	1	1	1,260	1
,,	3	2	2,430	1
,,	4	3	2,268	1
,,	5	4	2,544	—
,,	6	5	4,650	—
,,	7	6	1,152	1
,,	8	7	2,256	—
,,	9	—	—	1
,,	10	8	1,221	—

List of Private Tanks—*continued.*

District.	No. of House.	No. of Tank.	Contents in Cubic Feet.	No. of Wells.
X.	11	9	1,885	—
,,	14	—	—	1
,,	15	10	2,683	—
,,	16	—	—	1
,,	17	11	2,961	1
,,	18	12	2,144	—
,,	19	13	2,400	1
,,	20	—	—	1
,,	21	14	1,953	—
,,	22	15	2,403	1
			34,201	
XI.	1	1	9,720	—
,,	2	—	—	1
,,	4	2	2,145	—
,,	5	3	1,102	—
,,	6	4	1,102	—
,,	7	5	1,475	—
,,	8	6	2,646	—
,,	9	7	2,656	—
,,	10	8	1,365	—
,,	11	9	1,365	—
,,	16	10	1,827	—
,,	17	11	594	—
,,	19	12	720	—
,,	23	13	600	—
,,	24	14	1,033	—
,,	26	15	847	—
,,	27	16	1,526	—
,,	29	17	1,064	—
,,	31	18	560	—
,,	32	19	2,016	—
,,	33	20	1,874	—
,,	35	21	1,068	—
			37,305	
XII.	1	—	—	1
,,	2	—	—	1
,,	4	1	2,550	—
,,	5	2	1,050	—
,,	6	3	2,916	—
,,	8	4	1,683	—
,,	9	—	—	1
,,	11	5	1,188	—
,,	,,	6	2,112	—
,,	12	7	2,142	—
,,	13	8	3,036	—
,,	,,	9	2,137	—
,,	14	—	—	—
,,	15	11	3,403	—
,,	18	12	2,186	1
,,	19	13	1,887	—
			26,290	
XIII.	5	1	1,453	—
,,	,,	2	1,875	1
,,	6	3	1,942	1
,,	7	—	—	1
,,	10	—	—	1
,,	11	—	—	1
,,	12	—	—	1
,,	14	—	—	1
,,	15	4	1,454	1
,,	18	5	1,530	1
,,	19	6	1,776	—
,,	,,	—	—	1
,,	20	7	3,360	1
,,	23	8	3,542	—
,,	26	9	1,000	—
,,	27	10	1,800	—
,,	28	11	4,531	—
,,	29	—	—	1
,,	30	12	5,800	—
,,	31	13	2,000	—

List of Private Tanks—*continued.*

District.	No. of House.	No. of Tank.	Contents in Cubic Feet.	No. of Wells.
XIII.	32	14	4,500	1
,,	33	15	2,880	1
,,	34	16	2,940	—
,,	35	17	3,900	—
,,	36	—	—	1
,,	38	18	1,782	—
			48,065	
XIV.	1	1	1,600	—
,,	2	2	840	—
,,	4	3	3,192	1
,,	18	4	2,695	—
,,	19	5	1,326	—
,,	20	6	1,728	—
,,	21	7	2,016	—
,,	23	8	624	—
,,	26	9	2,156	—
,,	27	12	7,200	—
,,	30	11	1,040	—
,,	31	12	4,387	—
,,	,,	13	4,387	—
,,	,,	14	4,387	—
,,	39	15	1,063	—
,,	40	16	11,616	—
,,	41	17	401	—
			50,658	
XV.	1	1	2,152	1
,,	2	—	—	1
,,	5	2	2,400	—
,,	6	—	—	1
,,	7	—	—	1
,,	8	—	—	1
,,	10	—	—	1
,,	11	—	—	1
,,	12	3	2,880	—
,,	13	4	2,004	1
,,	14	5	2,664	1
,,	15	6	1,960	—
,,	16	—	—	1
,,	17	—	—	1
,,	18	7	776	1
,,	20	8	1,045	—
			17,881	
XVI.	1	—	—	1
,,	2	—	—	1
,,	3	1	1,425	1
,,	4	2	1,950	—
,,	5	—	—	1
,,	6	—	—	1
,,	7	—	—	1
,,	8	—	—	1
,,	9	—	1,950	1
,,	11	—	1,950	1
,,	13	3	3,311	1
,,	14	4	720	1
,,	15	5	1,558	1
,,	16	6	676	—
,,	17	7	2,457	—
,,	18	—	—	1
,,	19	8	2,255	1
,,	20	—	—	1
,,	21	9	2,772	1
,,	23	—	—	1
,,	24	—	—	1
,,	25	—	—	1
,,	26	10	1,451	1
,,	27	—	—	1
,,	28	11	882	—
,,	29	12	1,859	—
,,	,,	13	2,062	—
			27,278	

List of Private Tanks—*continued.*

District.	No. of House.	No. of Tank.	Contents in Cubic Feet.	No. of Wells.
XVII.	1	—	—	1
,,	2	1	426	1
,,	3	—	—	1
,,	4	—	—	1
,,	6	—	—	1
,,	7	2	1,638	—
,,	8	—	—	1
,,	10	3	3,663	—
,,	11	4	1,320	—
,,	12	5	1,680	—
,,	14	—	—	1
,,	16	—	—	1
,,	17	6	2,880	—
,,	19	7	1,560	1
,,	22	—	—	1
,,	23	8	1,140	1
,,	25	—	—	1
,,	26	9	1,350	1
,,	28	10	2,622	1
,,	,,	11	2,415	—
,,	Revenue Police Office		—	1
			20,694	
XVIII.	2	1	3,562	—
,,	3	2	2,503	—
,,	6	3	992	—
,,	7	4	1,421	—
,,	8	5	1,183	—
,,	9	6	1,650	—
,,	10	7	1,440	—
,,	11	8	504	—
,,	12	9	950	—
,,	14	10	3,062	—
,,	16	11	690	—
,,	,,	12	690	—
,,	17	13	3,240	—
,,	19	14	2,837	—
,,	22	15	2,700	—
,,	23	16	2,700	—
,,	24	17	1,035	—
,,	25	18	1,125	1
,,	26	19	3,099	—
,,	28	20	2,772	—
,,	29	21	3,162	—
,,	32	22	4,350	—
,,	33	23	1,600	—
,,	,,	24	1,936	—
			49,373	
XIX.	1	1	2,632	—
,,	2	2	810	—
,,	3	3	968	—
,,	4	4	2,112	—
,,	,,	5	612	—
,,	5	6	1,485	—
,,	7	7	3,030	—
,,	8	8	1,190	—
,,	9	9	1,980	—
,,	10	10	997	—
,,	11	—	—	1
,,	12	11	1,296	—
,,	13	12	1,020	—
,,	14	13	3,456	—
Garden.	15	14	2,457	—
,,	,,	15	1,529	—
,,	,,	16	1,361	—
No. 23 Yard.	,,	17	3,225	—
No. 22 Yard.	,,	18	1,100	—
,,	,,	19	2,511	—
			33,771	

List of Private Tanks—*continued.*

District.	No. of House.	No. of Tank.	Contents in Cubic Feet.	No. of Wells.
XX.	1	—	—	1
XXI.	1	1	1,710	1
,,	2	—	—	1
,,	3	2	2,520	—
,,	4	—	—	1
,,	5	3	720	1
,,	6	4	981	1
,,	8	—	—	1
,,	12	5	3,542	1
,,	13	6	1,870	—
,,	,,	7	3,135	—
,,	14	8	2,145	—
,,	15	9	1,215	1
,,	16	10	4,620	1
,,	17	11	1,254	1
,,	18	12	875	—
,,	19	13	390	—
,,	,,	14	2,160	—
,,	20	15	1,086	—
,,	21	—	—	1
,,	22	16	1,980	—
,,	23	17	3,564	—
,,	24	18	467	—
			34,234	
XXII.	1	1	2,268	1
,,	2	2	2,070	1
,,	5	—	—	1
,,	6	3	2,184	—
,,	8	—	—	1
,,	9	4	1,805	1
,,	,,	—	—	1
,,	10	5	888	1
,,	12	—	—	1
,,	14	6	1,552	—
,,	15	—	—	1
,,	16	7	4,350	1
			15,117	
XXIV.	1	1	1,943	—
,,	,,	2	2,394	—
,,	2	3	2,342	—
,,	,,	4	1,440	—
,,	6	5	1,482	—
,,	7	6	900	—
,,	8	7	1,260	—
,,	9	8	590	—
,,	10	9	5,628	—
,,	12	10	2,160	—
,,	15	11	2,464	—
,,	17	12	857	—
,,	20	13	808	—
,,	21	14	783	—
,,	22	15	500	—
,,	23	16	800	—
,,	24	17	960	—
,,	25	18	3,080	—
,,	27	19	1,260	—
,,	30	20	2,268	—
,,	30	21	900	—
,,	31	22	675	—
,,	,,	23	776	—
,,	32	24	1,156	—
,,	34	25	1,100	—
,,	35	26	1,920	—
,,	37	27	890	—
,,	38	28	943	—
,,	41	29	2,772	—
,,	43	30	931	—
,,	44	31	6,912	—
,,	45	32	607	—
,,	—	33	8,624	—
			62,155	

List of Private Tanks—*continued.*

District.	No. of House.	No. of Tank.	Contents in Cubic Feet.	No. of Wells.
XXV.	5	1	20,350	—
,,	,,	2	7,649	—
,,	10	3	6,720	—
,,	,,	4	1,053	—
,,	19	5	540	—
,,	20	6	810	—
,,	22	7	1,242	—
,,	24	8	6,400	—
,,	27	9	891	—
,,	29	10	1,440	—
,,	31	11	420	—
,,	34	12	560	—
,,	36	13	2,070	—
,,	39	14	1,559	—
,,	41	15	1,150	—
,,	42	16	3,696	—
,,	44	17	918	—
,,	45	18	720	—
,,	47	19	3,024	—
,,	,,	20	1,575	—
,,	48	21	1,053	—
,,	49	22	3,250	—
,,	50	23	630	—
,,	51	24	2,656	—
,,	55	25	1,701	—
,,	57	26	1,008	—
,,	58	27	2,080	—
			13,953	
XXVI.	1	1	1,500	—
,,	2	2	900	—
,,	6	3	1,110	—
,,	10	4	1,452	—
,,	11	5	1,350	—
,,	13	6	528	—
,,	14	7	1,650	—
,,	16	8	567	—
,,	,,	9	2,304	—
,,	17	10	1,800	—
,,	18	11	1,232	—
,,	23	12	1,254	—
,,	24	13	756	—
,,	,,	14	833	—
,,	26	15	783	—
,,	29	16	897	—
,,	31	17	1,092	—
,,	Civil Hospital	18	4,042	—
,,		19	3,289	—
,,		20	3,496	—
,,		21	1,417	—
			32,452	
XXVII.	1	1	1,380	—
,,	3	2	842	—
,,	5	3	1,300	—
,,	6	4	870	—
,,	7	5	1,450	—
,,	10	6	816	—
,,	12	7	828	—
,,	13	8	803	—
,,	15	9	1,943	—
,,	16	10	882	—
,,	18	11	1,039	—
,,	29	12	7,639	—
,,	35	13	25,300	—
			45,492	
XXVIII.	1	1	3,600	—
,,	,,	2	3,847	—
,,	,,	3	664	—
,,	,,	4	812	—
,,	,,	5	960	—
,,	2	6	3,750	—
,,	,,	7	972	—

List of Private Tanks—*continued.*

District.	No. of House.	No. of Tank.	Contents in Cubic Feet.	No. of Wells.
XXVIII.	2	8	1,152	—
”	3	9	2,970	—
”	”	10	2,880	—
”	”	11	3,360	—
			24,267	
SOUTH DISTRICT.				
I.	1	—	—	1
”	3	1	1,080	—
”	5	2	1,090	—
”	7	3	1,032	—
”	8	4	2,346	—
”	9	—	—	1
”	10	—	—	1
”	13	5	748	—
”	”	6	1,144	—
”	14	7	1,386	—
”	19	8	2,846	—
”	”	9	1,984	—
”	20	10	1,147	—
			14,803	
II.	1	1	574	—
”	2	—	—	3
”	4	2	1,800	—
”	5	3	994	—
”	6	4	2.057	—
”	7	5	2,420	—
”	10	—	—	1
”	11	6	1,872	—
”	13	—	—	1
”	17	7	2,200	—
			11,917	
III.	1	1	615	—
”	2	2	1,960	—
”	3	3	1,190	—
”	4	4	1,360	—
”	6	—	—	1
”	7	5	1,485	—
”	8	6	1,200	—
”	9	7	945	—
”	10	8	1,425	—
”	11	9	907	—
”	13	10	1,188	—
”	14	11	1,560	—
”	15	12	2,709	—
”	16	13	1,848	—
”	18	14	2,520	—
”	21	15	178	—
”	”	16	546	—
”	23	—	—	1
”	25	17	1,000	—
”	”	18	7,980	—
”	26	19	3,864	—
”	30	20	816	—
”	31	21	1,210	—
”	32	22	1,176	—
”	33	23	660	—
”	34	24	2,970	—
”	35	25	2,821	—
”	36	26	1,202	—
”	37	27	1,325	—
”	41	28	981	—
”	45	29	1,881	—
”	46	30	792	—
”	47	31	525	—
			50,819	
IV.	1	1	520	—
”	2	2	2,016	—
”	3	3	2,656	—

List of Private Tanks—*continued.*

District.	No. of House.	No. of Tank.	Contents in Cubic Feet.	No. of Wells.
IV.	4	4	669	—
”	5	5	1,080	—
”	6	6	4,025	—
”	8	7	1,755	—
”	9	8	2,057	—
			14,778	
V.	1	—	—	1
”	4	1	1,845	—
”	6	2	396	—
”	8	3	3,744	—
”	9	—	—	2
”	10	—	—	1
			5,985	
VI.	2	1	1,200	—
”	4	2	729	—
”	8	3	2,733	—
”	9	—	—	1
”	10	—	—	1
”	15	—	—	1
”	17	—	—	1
”	18	4	3,000	—
”	19	5	1,620	—
”	20	6	1,200	—
”	”	7	800	—
			11,282	
VII.	4	—	—	3
”	5	—	—	1
”	6	5	1,610	—
”	7	—	—	1
”	9	6	528	—
”	10	7	1,782	—
”	1	—	—	1
”	2	—	—	1
”	3	8	2,450	—
			6,370	
VIII.	1	1	900	—
”	3	2	2,100	—
”	”	3	2,975	—
			5,975	
IX.	1	—	1,923	—
”	2	—	—	1
”	5	—	1,097	—
”	6	—	997	—
”	7	—	3,744	—
			7,761	
X.	1	—	735	—
”	”	—	630	—
”	2	—	2,972	—
			4,337	
XI.	5	—	1,365	—
”	”	—	6,066	—
”	6	—	2,200	—
”	7	—	4,096	—
”	10	—	1,680	—
”	8	—	4,850	2
”	9	—	3,315	—
			23,572	

13th Jan. 1862.

J. L. WATSON,
Lieut. 25th Regt., K.O.Bs.

SUMMARY.

TOTAL CUBIC FEET IN TANKS IN NORTH DISTRICTS.

I.	12,242	XI.	37,305	XXI.	34,234
II.	40,027	XII.	26,290	XXII.	15,117
III.	51,122	XIII.	48,065	XXIII.	—
IV.	39,124	XIV.	50,658	XXIV.	62,155
V.	58,132	XV.	17,881	XXV.	13,953
VI.	39,846	XVI.	27,278	XXVI.	32,452
VII.	32,925	XVII.	20,694	XXVII.	45,492
VIII.	23,806	XVIII.	49,373	XXVIII.	24,267
IX.	10,934	XIX.	33,771		881,344
X.	34,201	XX.	—		

TOTAL CUBIC FEET IN TANKS OF SOUTH DISTRICT.

I.	14,803	VIII.	5,975
II.	11,917	IX.	7,761
III.	50,819	X.	4,337
IV.	14,778	XI.	23,572
V.	5,985		
VI.	11,282		157,599
VII.	6,370		

Total of North Districts	881,344
„ South District	157,599
	1,038,943

No. 5.

Chemical Department, Royal Arsenal,
Woolwich, S.E., 21st April 1862.

MEMORANDUM for the Inspector-General of Fortifications, from the Chemist of the War Department, with reference to Four Samples of Water received from Gibraltar, for Analysis.

The samples of water were described as follows :—

No. 1. Water from Neutral Ground well.
No. 2. „ from aqueduct.
No. 3. „ from tank.
No. 4. „ from well in yard of the public baths.

The proportions (in grains in an imperial gallon) of the important solid constituents of these waters are given in the following tabular statement :—

	I.	II.	III.	IV.
Sulphate of lime	4·56	12·49	1·55	15·16
Nitrate of lime	6·22	16·01	0·83	49·63
Carbonate of lime	12·24	17·04	0·94	—
Carbonate of magnesia	5·67	15·27	36·33	10·98
Nitrate of magnesia	—	—	—	7·11
Alkaline chlorides (chlorides of sodium and potassium).	7·48	28·59	3·59	80·24
Organic matter	4·06	9·94	5·02	7·70
Ammonia	Slight trace.	Slight trace.	Trace.	Slight trace.

The results of analysis show that the waters differ considerably from each other in composition.

No. 1 (from the Neutral Ground well), though a hard water, is considerably softer than the other three, and is therefore the most suitable for cooking and detergent purposes.

For drinking purposes the water from the tank (No. 3) is the least objectionable, since, though the proportion of organic matter which it contains is somewhat high, neither ammonia nor nitrates are present in considerable proportions. No. 1, on the other hand, contains a considerable amount of nitrates ; in No. 2 (aqueduct water), the proportion of nitric acid is very large ; while, in No. 4 (water from the well at the public baths), quite one-third of the solid matter contained in the water consists of nitrates. The two last-named waters (Nos. 2 and 4) are quite unfit for any but the most ordinary purposes, on account of their very great hardness, and of the very large proportions of nitrates and organic matter which they contain.

The water in the well at the public baths must, there is little doubt, become mixed to a very large extent with drainage matter, possibly in consequence of the shallowness of the well and of defects in its construction.

The composition of the aqueduct water favours the conclusion that this also must, in some way, be subject to similar contamination to the above well water.

J. A. ABEL,
Chemist of the War Department.

No. 6.

Garrison Quartermaster's Office,
Gibraltar, 20th June 1857.

SIR,

IN forwarding, for the information of your Excellency a return of the state of the tanks and wells, with the amount of water available for the use of the troops ; also a return of the amount of water required daily and also annually, I beg to make a few observations on the past and present means of supplying this population, consisting of, say, 16,000 inhabitants, and a garrison averaging in war 7,000, and in peace 6,000 troops.

In the first place the inhabitants owe nothing to the British Government for the small supply of water they have had for 150 years, because the first and the only supply of water led into the town was by means of an aqueduct of stone, mortar, and earthenware pipes, carried a distance of nearly one mile, between the source and the centre of the town, and all under ground ; unfortunately this underground communication has been cut off in several places by the erection of new works, and not rebuilt.

The source of this water supply is the face of the rock on which the rain falls and percolates through a bed of red sand, and a portion of the rain finds its way through weepers into a small tank or reservoir, from whence it flows into the town. It is a beautiful piece of work, said to be the ingenuity of an Italian during the occupation by the Spaniards, and doubtless answered every purpose, and afforded a bountiful supply to a small garrison and a population of 300 or 400 people, and it would be still ample for such a garrison and population, but not by any means sufficient for a garrison and population such as Gibraltar now contains, say, 23,000 souls ; and it would appear that from our conquest in 1704 down to within the last 15 years, nothing was done to collect water or to increase the supply, nothing whatever. That it was not until within the last 20 years that a system was commenced of building tanks at various barracks and quarters for the purpose of storing water for the troops, but even this has been so limited as to be quite inadequate to the wants of the garrison throughout the whole year, so much so that now, nearly all the tanks are exhausted at the beginning of summer, and when we cannot expect rain for three months.

The quantity of rain which fell on the ground from the first rains of the season, viz., 2nd August 1856 until 28th May 1857, was 25 inches and 239 parts of an inch, the average for the last 64 years being 31 inches 22 parts, or 6 inches below the average ; and while the fall has been 6 inches under average, unfortunately the whole of the rain *nearly* fell in the early part of the season ; and even then few of the tanks filled, from the paucity of spouting and conduits, and so long as water remained in the tanks it had to be used, to save expense of delivery by the contractor, but this expense is only shifted from the winter to the summer ; and another reason for the present deficiency arises from the crowded state of the garrison since the termination of the Russian war.

The present capacity of the military tanks amounts to 1,971,844 gallons, while the daily consumption amounts at present to 18,759 gallons, or per annum 6,845,935 gallons of water; thus it will be seen that tankage is still required to store nearly 5,000,000 gallons, and even then a much more extended system of conduits and spouting for filling would be required, not only for present, but for future tanks.

It is obvious that, from the immense rush of water which falls into the sea by means of the drains, &c., after two or three hours' rain, all that is required is an extended system of tanks, which ought to be above the town, and along the same level from north to south, or extending from the vicinity of the Moorish Castle to Windmill Hill. Those tanks or reservoirs might be excavated in the rock, and lined with brick and mortar, or the excavated stone and mortar; and I have no doubt that an able architect with 10,000*l.* and 200 convicts would place Gibraltar beyond the reach of want of water for ever.

It may be said, and probably it is true, that the supply of good water on the isthmus is inexhaustible, but the isthmus is below the level of any part of Gibraltar, and even if the water could be raised to a higher level, it would have to be forced into town through pipes by steam and machinery. Any work of this description on the north front, however, is highly objectionable, and in a military point of view is impossible. The Isthmus was occupied three times during the last century by an enemy, and their intrenchments were within 500 yards of the escarp, and as this may happen again, any measure adopted to procure water from the isthmus must be temporary; and considering that the conveyance from thence is expensive and tedious, it should not be considered as a means of itself anything half so important as the supply of the garrison itself with water, since it is evident that the Spaniards at a time when they never dreamt of the capture of Gibraltar, and with their own peninsula behind them, thought it necessary to undertake a measure of supply from inside, and the reservoir and aqueduct is a proof of their forethought.

Under those circumstances I am humbly of opinion that the time has fully arrived for Her Majesty's Government to undertake an important, strong, and efficient measure in connexion with the certain supply, by means of extensive reservoirs to contain large resources of water within the limits of the fortress.

That, as your Excellency is aware, no house is now permitted, nor has been for some years permitted, to be erected, without a tank forming part of the outlay on the property, and thus there are very many tanks in the fortress belonging to the inhabitants of the better class, but the owners also complain of the dryness of the season, and the low state of their tanks. But it is the poor who will most suffer from the high price of water when conveyed from the isthmus by means of water casks and donkeys; and that the troops too, must, will, and do suffer when placed on a stinted allowance of 2½ gallons a man daily for cooking and drinking, delivered at their several barracks.

That, with regard to the civil population, if a bountiful supply was always at hand, and that water could be led into their houses in town, by means of reservoirs from above, there is no possible reason why a water tax should not be laid on the rental, similar to the scavenging and lighting rate, which is 3⅓ per cent. on all property, and which is really the only tax of any kind in Gibraltar. Last year the declared value of property liable for the said tax was valued at 60,765*l.*, and the rate or tax amounted to 2,025*l.*, thus a rate of 2 per cent. would raise 1,215*l.* per annum towards any extensive outlay by Her Majesty's Government for a certain supply in this most important possession.

I have, &c.
W. Hume,
His Excellency Garrison Quartermaster.
Lt.-Gen. Sir James Ferguson, K.C.B.,
Governor.

Garrison Quartermaster's Office, Gibraltar,
20th June 1857.

Return of the Quantity of Water to which the Military Departments and Troops are entitled daily in the Garrison of Gibraltar, showing the Number of Gallons at present procured on the Spot, from Tanks and Wells, and the Number of Gallons supplied by Contract.

Department, Regiment, or Corps.	Gallons of Water entitled to daily.	No. of Gallons procured on the Spot.	No. of Gallons supplied by Contractor.
Personal Staff of his Excellency the Governor - -	67	23	44
Staff—1st Brigade - -	46	2	44
2nd Ditto - -	73	13	60
Assistant Adjutant-General -	21	—	21
„ Quartermaster-General	21	—	21
Town Major's - - -	27	—	27
Garrison Quartermasters' -	23	8	15
Medical - - - -	82	25	57
Barrack - - .. -	23	6	17
Prisons and Cells .. -	292	292	—
Royal Artillery - - -	3,000	1,263	1,737
„ Engineers - -	739	462	277
2nd Battalion 1st Royal Regiment	2,396	837	1,559
30th - - - -	2,356	621	1,735
31st - - - -	2,329	664	1,665
47th - - - -	2,323	2,015	308
55th - - - -	2,048	1,607	441
92nd - - - -	2,361	2,215	146
Garrison Guards - -	—	—	382
Hospitals, extra - - -	—	—	150
Total - -	18,227	10,074	8,685

Present daily cost of supplying 8,685 gallons of water, at 4*s.* per 500 gallons, 3*l.* 9*s.* 3*d.*

(Signed) W. Hume,
Garrison Quartermaster.

Cost of Transport of Water for the Troops, &c., during 5 years, viz.:

	£	s.	d.
1852–53 - -	532	19	5
1853–54 - -	582	8	2
1854–55 - -	508	18	9
1855–56 - -	302	0	1
1856–57 - -	579	2	2
	£2,505	8	7

Extract from Return furnished by the Sanitary Inspectors on the subject of Water Supply at Gibraltar, with an Approximate Consumption and Expense thereof to the Inhabitants.

Distribution.	Per Annum, Gallons.
179 houses having no water laid on—no wells, containing 2,775 souls, who consume more or less 1½ gallons of water daily, which is conveyed on donkeys from the fountain in the centre of the town when water is to be had there, otherwise from the north front; water, sweet; but hard and brackish	1,519,130
133 houses have wells of bad and brackish water, containing 2,320 persons, who consume one gallon of water daily - - - - -	846,800
136 houses having cisterns, which are for the most part dry from 1st Aug. to 30th Sept. in each year, say 60, which houses contain 4,497 persons, who consume 1½ gallons on an average daily - - - - -	404,730
10 wine houses and taverns that have wells of brackish water, and consume about 40 gallons each daily - -	146,200
	2,910,860 Say 3,000,000

Recapitulation.

3,000,000 gallons, at 5 gallons to a barrel, 600,000 barrel, at 1*d*. per barrel, 2,500*l*. sterling per annum.

(Signed) W. HUME,
Garrison Quartermaster.

Gibraltar, 20th June 1857.

No. 7.

RETURNS showing the NUMBER of HOUSES, POPULATION, AMOUNT of WATER CARRIED INTO THE TOWN, its COST, also the DEATHS for Ten Years.

Number of Houses in Gibraltar.

North Districts	-	853
South Districts	-	161
Total	-	1,014

Fixed Population of Gibraltar.

North Districts	Males	-	6,358
	Females	-	7,540
South Districts	Males	-	781
	Females	-	883
	Total	-	15,562

Total fixed Population	-	15,562
Floating Population	-	2,085
Grand Total	-	17,647

Average Quantity of Water brought into the Garrison by Hand in 1860,—2,243,580 gallons, for Town district.

Estimate of annual cost of water per house, 3*l*. 19*s*. 1*d*.

Deaths at Gibraltar during the last Ten Years, exclusive of Military and Convicts.

Year.	No. of Deaths.	Year.	No. of Deaths.
1851 -	465	1857 -	573
1852 -	378	1858 -	431
1853 -	453	1859 -	444
1854 -	491	1860 -	548
1855 -	488		
1856 -	146	Total -	4,729

Police Office, Gibraltar, 26th September 1861.

FRED. MIDDLETON,
Acting Police Magistrate.

No. 8.

MEMORANDA for the SANITARY COMMISSION.

MILITARY.

Return of Water Allowance.

Each commissioned officer	-	7	gallons daily.
,, non-commissioned officer, rank and file	-	2½	,, ,,
,, woman	-	2½	,, ,,
,, child	-	1	,, ,,
,, civil servant	-	2	,, ,,
,, horse	-	6	,, ,,
,, officers' mess	-	100	,, ,,
,, serjeants' mess	-	14	,, ,,
,, school-room	-	8	,, ,,
,, dispensary	-	8	,, ,,

The water conveyed to the troops in garrison, by contractor, is taken indiscriminately from the wells on the North Front, the Jumpers, and Ragged Staff; the expense of conveying water to the troops on the average for five years is 500*l*. per annum. (See Return, *supra*.)

CIVIL.

An assessed rate on the annual rental of houses stables, cellars, vaults, buildings, &c., &c., according to the yearly value thereof, of a sum not exceeding 3⅓ per centum for the purpose of paving, repairing, and cleaning, and also for lighting the streets, lanes, alleys, &c., and for making and repairing sewers and drains, &c.

The annual rental for 1861 is computed at $355,380, at 3⅓ per cent. is equal to $11,846, adding the annual contribution for barracks $1,152, making the annual assessment for the above purpose, for the present year $12,998.

W. HUME,
Garrison Quartermaster.

No. 9.

By his Excellency Lieutenant-General Sir W. J. Codrington, K.C.B., Governor and Commander-in-Chief of the city and garrison of Gibraltar, &c.

I do hereby nominate and appoint the garrison quartermaster, or person acting as such for the time being, James Bassadone, James Barboro, Francis Imossi, Judah Nahon, Julius Peire, Francis Balestrino, Michael J. Coll, Andrew Carara, Anthony Gudice, Richard Parody, and Richard Abrines, Esquires, to act during the present year 1861, as the Commissioners and surveyors of the highways, streets, lanes, alleys, passages, and other public places of this city and garrison; and I authorize and direct you, or any of you, to superintend and carry into effect the paving repairing, and cleaning the same, and the making and repairing the sewers and drains therein, and generally to direct the scavenging department, and also the lighting this city and garrison, and to do all matters and things necessary in furtherance of the above objects within this city, garrison, and territory of Gibraltar, and the limits and precincts thereof; for which purpose I do hereby authorize William Hume, Esquire, garrison quartermaster, to act as treasurer and to receive all sums of money collected by the collector appointed by me for that purpose upon the "paving and scavenger's rate," and upon the "rate for lighting" for this present year, and to give legal discharge to such collector for the same: and I do hereby further direct you, or any five of you, as such surveyors as above mentioned, to make usual quarterly returns to me of all sums received and delivered by you as such surveyors, and of the stock of the above establishment. and of all the funds in the hands of the treasurer, with all proper vouchers as usual, in order that when sanctioned and approved by me, the same may be regularly laid before the public, by insertion in the Gibraltar Chronicle.

Given at Gibraltar this 4th day of January 1861.

W. J. CODRINGTON,
Lieut.-Gen. and Governor.

By command.
S. FREELING, Colonial Secretary.

No. 10.

PAVING AND SCAVENGER'S RATE.

At the Court at Brighton, the 30th day of December 1815:

PRESENT,

His Royal Highness the Prince Regent in Council.

It is this day ordered by His Royal Highness the Prince Regent, in the name and on the behalf of His Majesty, and by and with the advice of His Majesty's Privy Council:—

Paving and Scavenger's Rate to be levied.

That from and after the 1st day of February next there shall be assessed and levied, within His Majesty's garrison and town of Gibraltar and the limits and precincts thereof, a rate for the purpose of paving, repairing, and cleansing the streets, lanes, alleys, passages, and other public places thereof, and of making and repairing the sewers and drains therein, which rate shall be called a paving and seavenger's rate.

Persons to be assessed.—Amount.

And it is hereby further ordered, that such rate shall from time to time, so often as there shall be occasion, be assessed on every person who shall inhabit, use, occupy, possess, or enjoy any house, shop, or warehouse, coach-house, stable, cellar, vault, building, land, tenement, or other hereditament within His Majesty's garrison and town of Gibraltar, or the limits or precincts thereof, according to the yearly value thereof, not exceeding three per cent. of such yearly value.

Assessment to be made by Commissioners.

And it is hereby further ordered, that such assessment shall be made from time to time by Commissioners who shall be appointed by the Governor, or in his absence by the Lieutenant-Governor, or in his absence by the Commander of His Majesty's Forces of Gibraltar for the time being, and shall be signed by such Commissioners, or any three of them, who shall give public notice thereof as soon as conveniently may be, in the Gazette published at Gibraltar, and deposit the same in the custody of some clerk or officer to be named in such notice, in whose hands all persons assessed shall have permission, at reasonable times, to peruse the same, and take extracts therefrom at their own expense.

Appeal to two Justices.—Determination of Justices to be final.

And it is hereby further ordered, that it shall be lawful for any person assessed to appeal against such assessment to His Majesty's justices of the peace for the said garrison and town, which appeal may be heard by any two of them; provided that such appeal shall be lodged with one of such justices, within six days after public notice shall be given of the rate being made as aforesaid, and provided eight days notice of such appeal shall be given to the Commissioners signing the assessment, or to the clerk or officer with whom the same shall be deposited as aforesaid, and also to any other parties assessed who may be affected by such appeal; and that the justices before whom such appeal is heard, shall have power to relieve the appellant by amending or altering the rate, in respect of the matter which shall be the subject of such appeal, as to them shall seem just, and in default of such appeal the assessment shall be binding; and in case of appeal the determination of the justices on any such appeal shall be final and conclusive to all intents and purposes.

Governor to appoint a Collector.—Collector to give Bond.

And it is hereby further ordered, that the Governor or in his absence the Lieutenant-Governor, or in his absence the Commander of the Forces for the time being, shall from time to time, by writing under their respective hands and seals, nominate and appoint a collector or collectors of such rate, and shall have power to remove such collector or collectors from time to time, and to appoint another or others in the stead of him or them so removed respectively; and that every such collector shall give bond to His Majesty, His heirs and successors, in such penal sum and with so many sureties as to the Governor, Lieutenant-Governor, or Commander of the Forces shall seem fit, for the due collection of all rates to be made while he shall continue to fill the office of collector, and for duly accounting for and paying over all rates by him collected to such officer as by the Governor, Lieutenant-Governor, or Commander of the Forces shall be approved for that purpose, and that the money so collected shall be applied in the payment of the expenses already incurred or which may hereafter be incurred in the paving, repairing, and cleansing the streets, lanes, alleys, passages, and other places of the said garrison and town.

Collector to receive Compensation.

And it is hereby further ordered, that every such collector shall receive compensation for his time, trouble, and responsibility in collecting such rates, by an allowance to be made to him by the authority of the Governor, Lieutenant-Governor, or Commander-in-Chief for the time being; provided such allowance shall be sanctioned by one of His Majesty's Principal Secretaries of State.

Process to compel Payment by Distress and Sale.
(*Vide Charter of Justice*, (*supra. p.* 14.)

And it is hereby further ordered, that in case any person assessed to such rate shall refuse or neglect to pay the sum assessed to him or her, after demand thereof made at his or her usual place of abode, or upon the premises assessed, the collector shall, by warrant under the hand and seal of the Governor, Lieutenant-Governor, or Commander of the forces for the time being, levy such rate, and all arrears thereof, and the reasonable expenses of such levy, on the goods and chattels of the person charged with such rate, in any part of the said garrison and town, or limits and precincts aforesaid; and if within five days after such distress taken, the sum assessed shall not be paid, together with the reasonable charges of taking and keeping the distress, the collector shall cause the same to be appraised and sold, either by public auction or private contract, or such part as shall be sufficient to pay the sum assessed, with all charges of taking, keeping, and selling the distress, and shall return to the owner of such goods and chattels the surplus thereof, if any shall be; and if any goods or chattels of such persons refusing or neglecting to pay such rates shall be taken in execution for the debt of any other person, or distrained for rent, before such rate shall be paid, the officer executing, or the party so distraining, shall first pay or satisfy, out of the proceeds of such goods and chattels, the amount of the said rate then due, and all arrears thereof.

Fraudulent Removal of Goods to avoid Distress.

And it is hereby further ordered, that in case any person so assessed shall fraudulently or clandestinely convey away his goods and chattels for the purpose of preventing the same from being distrained for such rate, it shall be lawful for the collector, being empowered by such warrant as aforesaid, within thirty days next after such conveying away of such goods and chattels, to seize the same, wherever the same shall be found, as a distress for the said rate, and to sell or otherwise to dispose of the same in such manner as if the same had not been conveyed away, provided that such goods and chattels shall not, before such seizure made, have been sold bonâ fide, and for a valuable consideration, to any person not privy to such fraudulent conveying away as aforesaid. And the Right Honourable the Lords Commissioners of His Majesty's Treasury, and the Right Honourable Earl Bathurst, one of His Majesty's Principal Secretaries of State, are to give the necessary directions herein accordingly.

CHETWYND.

LIGHTING RATE.

At the Court at Brighton, the 1st of February 1819:

PRESENT,

His Royal Highness the Prince Regent in Council.

I. Whereas by an Order of His Royal Highness the Prince Regent, in the name and on behalf of His Majesty, and by and with the advice of His Majesty's Privy Council, made on the 30th day of December 1815, it was ordered, that from and after the first day of February next after the date of the said Order, there should be assessed and levied within His Majesty's garrison and town of Gibraltar, and the limits and precincts thereof, a rate for the purpose of paving, repairing, and cleansing the streets, lanes, alleys, passages, and other public places thereof, and of making and repairing the sewers and drains therein, which should be called a paving and scavenger's rate.

II. And it thereby further ordered that such rate should from time to time be assessed on every person who should inhabit, use, occupy, possess, or enjoy any house, shop, warehouse, coach-house, stable, cellar, vault, or building, land, tenement, or other hereditament within His Majesty's garrison and town of Gibraltar, or the limits or precincts thereof, according to the yearly value thereof, not exceeding three per cent. of such yearly value.

III. And whereas certain Commissioners to be appointed by the Governor, or in his absence the Lieutenant-Governor, or in his absence by the Commander of His Majesty's Forces for the time being, were by the said Order authorized and empowered to make such assessment from time to time in manner therein specified, and certain provisions, authorities, and directions were therein specified for the purpose of collecting and levying the said assessment, and of appealing against the same.

IV. And whereas it is expedient and necessary that provision should also be made for lighting the said garrison and town of Gibraltar, and the limits and precincts thereof, and that provision should be made for the purpose of defraying one half of the expense by the inhabitants of the said garrison and town, and the limits and precincts thereof.

V. It is this day ordered by His Royal Highness the Prince Regent, in the name and on the behalf of His Majesty, and by and with the advice of His Majesty's Privy Council, that from and after the first day of April next, there shall be assessed and levied within His Majesty's garrison and town of Gibraltar, and the limits and precincts thereof, a rate for the purpose of lighting the streets, lanes, alleys, passages, and other public places thereof, which shall be called a rate for lighting the garrison and town of Gibraltar.

Persons to be assessed.—Amount.

VI. And it is hereby further ordered, that such rate shall from time to time, so often as there shall be occasion, be assessed on every person who shall inhabit, use, occupy, possess, or enjoy any house, shop, warehouse, coach-house, stable, cellar, vault, building, land, tenement, or other hereditament within His Majesty's garrison and town of Gibraltar, or the limits or precincts thereof, according to the yearly value thereof, not exceeding one-third of a pound sterling per cent. of such yearly value.

Assessment to be made by the Commissioners under recited Order, and in the same manner.

VII. And it is hereby further ordered, that such assessment shall be made from time to time by the Commissioners appointed or to be appointed from time to time under the authority and powers of the said recited Order of 30th December 1815, for the making of the assessment of the rate in such manner and form, and according to the same rules and regulations as are by the said recited Order of the 30th December 1815, ordered and directed with respect to the assessment of the said paving and scavenger's rate thereby imposed.

Method of Appeal to be the same.

VIII. And it is hereby further ordered, that it shall be lawful for any person or persons assessed to the rate hereby imposed to appeal against the same, in the same manner and form, and under the like rules and regulations and notices, and to the like tribunals and justices, and to receive relief therein under the like rules, regulations, and restrictions as are by the said recited Order ordered and directed with respect to appeals against the said paving and scavenger's rate, in the same manner as if the same rules, regulations, and restrictions were in this Order repeated, enumerated, and set forth.

Method of Collection to be the same.

IX. And it is hereby further ordered, that the rate hereby imposed for lighting the garrison and town of Gibraltar shall be collected and levied by the same persons, and under the like allowances, rules, regulations, directions, and restrictions as are ordered, directed, and specified in the said recited Order of the 30th December 1815, relative to the collecting and levying the said rate called the paving and scavenger's rate; and that all such allowances, rules, regulations, directions, and restrictions as are ordered, directed, and specified in the said recited Order with respect to the rate called the paving and scavenger's rate, shall be and the same are hereby applied and ordered to be applied to the collecting and levying the rate hereby imposed for lighting the garrison and town of Gibraltar, as if the same were herein repeated, enumerated, and set forth.

X. And the Right Honourable the Lords Commissioners of His Majesty's Treasury, and the Right Honourable Earl Bathurst, one of His Majesty's Principal Secretaries of State, are to give the necessary directions herein accordingly.

James Buller.

By his Excellency Lieutenant-General Sir W. J. Codrington, K.C.B., &c., Governor and Commander-in-Chief of the city and garrison of Gibraltar, &c. &c.

By virtue of the power and authority vested in me, I do hereby nominate and appoint John Peacock, James Smith, Andrew Cormack, Joseph Shakery, William Glassford, Moses Camino, John Collingwood, Francis Francia, junior, Charles Thibaudier, Bartholomew Mascardi, Henry Foote, and Judah de Azar Serfaty, Esquires, to be Commissioners to make an assessment for a rate or rates for one year commencing on the 1st day of January 1861, for the purpose of paving, repairing, and cleaning, and also for lighting the streets, lanes, alleys, passages, and other public places of this city, garrison, and territory, and for making and repairing the sewers and drains therein, and paying all the expenses already incurred, or which may be hereafter incurred in this respect to be called "the paving and scavenger's rate," and a "rate for lighting," to be duly assessed and levied within the city, garrison, and territory of Gibraltar, and the limits and precincts thereof, on any person who shall inhabit, use, occupy, possess, or enjoy any house, stable, cellar, vault, building, lands, tenements, or other hereditaments within the same, according to the yearly value thereof, in pursuance of the Orders in Council in that behalf made and provided.

And I do hereby further desire you, or any three of you at the least, to sign such assessment or rates, and to deposit the same as soon as made, in the custody of the clerk of arraigns, and to give public notice forthwith in the Gibraltar Chronicle, that the same has been so made and deposited: And the persons assessed may have permission to peruse the same at all reasonable times, and to take extracts therefrom at their own expense.

Given at Gibraltar this 4th day of December 1860.

W. J. Codrington,
Lt.-Gen. and Governor.

By command.
S. Freeling, Colonial Secretary.

1861.

Assessed rates at 3⅓ per cent.

	$
Private properties - - - -	28,393
Barrack and engineer department - -	266
Commissariat department - - - -	272
Naval department - - - - -	82
Revenue department - - - -	502
Cottage, Europa Advance - - -	100
Monthly rental -	$29,615
Annual rental -	$355,380
$355,380, at 3⅓ per cent. - - -	$11,846
Adding annual contribution from the barrack department - - -	1,152
Annual assessment for 1861 -	$12,998

W. Hume,
Garrison Quartermaster.

No. 11.

SICKNESS and MORTALITY among TROOPS at GIBRALTAR.

Classes.	Orders.	—	1859.—Strength 5,153.						1837–46. Average Annual Strength, 3,313.		Infantry at Home, 1859.	
			Admitted into Hospital.	Deaths.		Total.	Annual Ratio per 1,000 of Strength.		Annual Ratio per 1,000 of Strength.		Annual Ratio per 1,000.	
				At Gibraltar.	Of Invalids.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
I.	1	Miasmatic diseases -	1,472	20	—	20	285·6	3·88	356·4	3·47	168·1	1·12
	2	Enthetic - -	1,334	—	—	—	258·9	—	78·8	—	399·4	—
	3	Dietic - -	—	2	—	2	—	·39	·2	—	1·2	—
	4	Parasitic - -	52	—	—	—	10·1	—	1·7	—	27·2	—
II.	1	Diathetic - -	38	—	—	—	7·4	—	3·1	·09	2·	·10
	2	Tubercular - -	31	2	3	5	6·	·97	11·	4·89	12·7	2·55
		Diseases of the—										
III.	1	Nervous system -	81	1	—	1	15·7	·19	18·6	1·15	11·3	·51
	2	Circulatory ,, -	54	2	—	2	10·5	·39	4·5	·63	7·	·66
	3	Respiratory ,, -	350	1	—	1	67·9	·19	125·3	1·03	94·3	1·12
	4	Digestive ,, -	150	2	—	2	29·1	·39	73·9	·72	28·4	·41
	5	Urinary ,, -	10	—	—	—	1·9	—	1·4	—	1·4	·15
	6	Reproductive ,, -	9	—	—	—	1·7	—	1·3	—	1·	—
	7	Locomotive ,, -	17	—	—	—	3·3	—	·7	—	2·3	·05
	8	Integumentary ,, -	837	—	—	—	162·5	—	152·6	·21	128·1	—
IV. -	4	Diseases of Nutrition	3	—	—	—	·6	—	·2	·09	2·5	—
V.	1	Accidents - -	355	1	—	1	68·9	·19	100·9	·82	60·6	·77
	3	Homicide - -	—	—	—	—	—	—	—	·03	—	—
	4	Suicide - -	—	5	—	5	—	·98	—	·30	·1	·15
	5	Execution - -	—	1	—	1	—	·19	—	·06	—	—
	6	Corporal Punishment	23	—	—	—	4·5	—	5·2	—	5·4	—
		Diseases not stated -	73	—	—	—	14·2	—	2·9	·09	11·	—
		Total - -	4,889	37	3	40	948·8	7·76	938·7	13·58	964·0	7·59

No. 12.

TABLE showing the Number of Men in each Barrack in the Garrison for every 50 cubic feet of space in Barrack Rooms from 250 to above 600 cubic feet, and for every 10 superficial feet from 20 to above 60 superficial feet per Man.

Barracks.	Cubic Feet.							Superficial Feet.				
	250 to 300.	350 to 400.	400 to 450.	450 to 500.	500 to 550.	550 to 600.	Above 600.	20 to 30.	30 to 40.	40 to 50.	50 to 60.	Above 60.
	No. of Men.	No. of Men.	No. of Men.	No. of Men.	No. of Men.	No. of Men.	No. of Men.	No. of Men.	No. of Men.	No. of Men.	No. of Men.	No. of Men.
Grand Casemates -	—	602	564	—	—	—	—	—	1,166	—	—	—
Orange Bastion -	—	—	160	—	—	—	—	—	160	—	—	—
Prince Albert's Front	—	90	—	—	—	—	24	—	90	12	—	12
King's Bastion -	—	—	256	—	—	—	—	—	256	—	—	—
Wellington Front -	—	24	—	436	38	18	17	44	489	—	—	—
Moorish Castle -	—	40	40	—	—	—	—	—	80	—	—	—
Gunner's Barracks	—	—	—	24	—	—	—	—	—	24	—	—
Town Range -	—	100	220	—	—	—	—	—	320	—	—	—
Hargrave's Barracks	—	71	20	—	—	40	—	—	111	20	—	—
Jumper's Bastion -	—	—	—	—	192	—	—	—	192	—	—	—
Rosia Casemates -	—	—	72	—	—	—	—	—	72	—	—	—
South Barracks -	—	—	696	—	—	—	—	—	696	—	—	—
Rosia Barracks -	—	—	—	—	549	—	—	—	549	—	—	—
Buena Vista -	—	—	220	132	64	—	—	—	416	—	—	—
Windmill Hill -	402	—	—	—	—	—	—	402	—	—	—	—
Fuze House -	—	—	—	—	—	—	22	—	—	—	22	—
Defensible Barracks	—	—	—	—	—	100	—	—	100	—	—	—
Europa new Huts	—	—	—	—	—	384	—	—	—	384	—	—
Brewery Barracks	—	—	40	40	—	30	—	—	110	—	—	—
Total -	402	927	2,288	632	843	572	63	446	4,807	440	22	12

No. 13.

RETURN of BARRACKS at GIBRALTAR, showing the COOKING ACCOMMODATION of each.

Royal Engineer Office, Gibraltar, 24th September 1860.

Barracks.	Boilers, Elliptical, Regulation Pattern, 25 galls., with Steam Pipe.	Boilers, Elliptical, Regulation Pattern, 25 galls., without Steam Pipe.	Boilers, Elliptical, Regulation Pattern, 15 galls., with Steam Pipe.	Boilers, Elliptical, Regulation Pattern, 15 galls., without Steam Pipe.	Boilers, Rectangular, without Steam Pipe.		Boilers, Rectangular, without Steam Pipe.		Common Cast Iron Pots, 16 Gals.	Crimean Stoves, &c.	Ovens.		Benham's Cooking Apparatus for 1,000 Men.
					26″ by 19″ and 19″	24″ by 16″ and 16″	19″ by 13″	28″ by 16″			Brick.	Iron.	
Hargraves Barracks -	6	—	—	—	—	—	—	—	—	—	1	—	—
Town Range Barracks -	8	—	—	—	—	—	—	—	—	—	—	—	—
Moorish Castle - -	4	—	—	—	—	—	—	—	—	—	1	—	—
Grand Casemates - -	24	—	—	—	—	1	1	3	—	—	2	—	—
Orange Bastion - -	5	—	—	—	—	—	—	—	—	—	1	—	—
P. Albert's Front Barrks.	4	—	—	—	—	—	—	—	—	—	1	—	—
King's Bastion - -	8	—	—	—	—	—	—	—	—	—	2	—	—
Wellington Front - -	12	—	—	—	—	—	—	—	—	—	1	—	—
North Front Camp -	—	6	—	—	4	—	—	—	—	25	—	—	—
Catalan Bay - -	1	—	—	—	1	—	—	—	—	—	—	—	—
Gunners Barracks -	—	—	—	—	—	2	1	—	—	—	1	—	—
Jumper's Bastion - -	6	—	—	—	—	—	—	—	—	—	1	—	—
South Barracks - -	19	—	8	—	—	—	—	—	—	—	2	1	—
Rosia Barracks - -	14	—	—	—	—	—	—	—	—	—	1	—	—
Rosia Casemates - -	2	—	—	—	—	—	—	—	—	—	—	—	—
Buena Vista Barracks -	—	10	—	—	—	—	—	—	—	—	—	—	—
Windmill Hill Barracks -	—	11	—	1	—	—	—	—	—	—	1	—	—
Windmill Hill Huts -	—	10	—	—	—	—	—	—	—	—	—	—	—
Europa New Hutment -	6	—	—	—	—	—	—	—	—	—	—	—	1
Old Hutment - -	—	2	—	3	—	—	—	—	—	—	—	—	—
Defensible Barrack -	4	—	—	—	—	—	—	—	—	—	1	—	—
Brewery Barrack - -	—	3	—	—	—	—	—	—	—	—	1	—	—
Fuze House - -	—	1	—	—	—	—	—	—	1	—	—	—	—

N. FERGUSON, Clerk of Works.

No. 14.

RETURN of ordinary BARRACK ROOMS, WOODEN HUTS, and other BUILDINGS occupied by MARRIED SOLDIERS on the 1st October 1861, together with the NUMBER of INMATES, MEN, WOMEN, and CHILDREN, in each ROOM; also the NUMBER of suitable MARRIED QUARTERS required for the GARRISON.

A.—BARRACK ROOMS.

Corps.	Name of Barrack.	No. of Room.	Dimensions with cubic Contents.	Occupied by			Remarks.
				No. of Men.	No. of Women.	No. of Children.	
			cubic feet.				
Royal Artillery -	Jumper's Bastion - -	5	14,592	6	6	4	
		6	14,592	8	8	9	
Royal Engineers -	None.						
2d Batt. 6th Regt.	None.						
2d Batt. 7th Regt.	None.						
2d Batt. 8th Regt.	Wellington Front - -	soldier 1	10,863	6	6	12	
	,, - -	,, 2	10,891	6	6	14	
	,, - -	,, 4	11,342	5	5	6	
	,, - -	,, 5	13,244	6	6	13	
	,, - -	N.C.O. 2	2,959	1	1	2	
	,, - -	,, 3	2,959	1	1	–	
	,, - -	,, 4	2,959	1	1	–	
	,, - -	store 1	2,959	1	1	3	
	,, - -	,, 2	2,959	1	1	2	
	King's Bastion - -	soldier 14	5,922	6	6	8	
	,, - -	,, 15	5,922	6	6	11	
	,, - -	,, 16	5,874	6	6	6	
	Town Range - - -	,, 5	9,546	6	6	6	
1st Batt. 25th Regt.	Rosia Casemates - -	2	4,997	1	1	3	
	,, - -	3	4,997	3	3	5	
	,, - -	4	4,958	1	1	3	
	,, - -	5	4,958	2	2	2	
100th Regiment -	Grand Casemates - -	11	20,107	10	10	10	
		12	19,549	9	10	18	

B.—NUMBER of WOODEN HUTS or other BUILDINGS (distinguishing the Nature).

Corps.	Whether Hut or Building.	No. of Hut or Building.	Dimensions with cubic Contents.	Occupied by			Remarks.
				No. of Men.	No. of Women.	No. of Children.	
			cubic feet.				
Royal Artillery -	Casemates, Prince Albert's Front (intended for store rooms) - - -	9	6,114	3	3	1	
		10	6,114	2	2	1	
		11	6,114	2	2	3	
		12	6,114	2	2	2	
	Retrenchment (officers' quarters) King's Bastion -	2	3,776	1	1	4	Master Gunner.
	Officers' quarters, South Jumpers - -	1	5,239	1	1	–	Master Gunner.
		2	5,185	1	1	2	
	Officers' kitchens, South Jumpers - - -	1	5,555	1	1	–	Assistant Gunnery Instructors.
		3	5,555	1	1	–	
	Europa Flats. Officers' guard room -	–	4,051	1	1	2	Master Gunner.
	Europa Flats. Huts - - -	3	2,071 each room.	1	1	–	
		4	2,071	1	–	–	Pay Serjeant.
		5	2,071	1	1	1	
		6	2,071	1	1	1	
	Europa Flats. School room, Brewery barracks - -	–	2,599	1	1	1	Pay Serjeant.
	Europa Flats. Boxes, Brewery barracks	3	20,623	7	7	11	This room is partitioned into 10 boxes, occasionally occupied by 10 families.
	Huts, Windmill Hill -	3	4,295	2	2	3	
		5	4,343	1	1	4	Master Gunner.
	Cottages, Moorish Castle. The private property of Royal Artillery, kept in repair by a small rental levied upon the occupants.	1	3,564	1	1	1	
		2	1,589	1	1	–	
		3	1,662	1	1	5	
		4	1,845	1	1	1	
		5	1,717	1	1	1	
		6	1,453	1	–	–	Pay Serjeant.
		7	1,364	1	1	1	
		8	1,834	1	1	–	
		9	—	1	1	2	
		10	4,513	1	1	3	Master Gunner.
		11	2,072	1	1	1	
		12	2,072	1	1	–	
	Cottages, Moorish Castle. The private property of Royal Artillery, kept in repair by a small rental levied upon the occupants.	13	2,072	1	1	1	
		14	2,072	1	1	2	
		15	1,922	1	1	1	
		16	1,224	1	1	1	
		17	1,293	1	1	3	
		18	2,581	1	1	–	
		19	2,049	1	1	3	
		20	1,607	1	1	2	
		22	2,194	1	1	3	
		23	2,114	1	1	2	
		24	1,618	1	1	–	
		25	1,739	1	1	–	
		26	1,637	1	1	3	
		27	1,641	1	1	–	
		28	2,118	1	1	6	
		29	2,118	1	1	1	
		30	2,118	1	1	2	
		31	1,911	1	1	1	
		32	5,041	1	1	1	Master Gunner.
		33	2,394	1	1	4	
		34	3.442	1	1	5	
		35	1,255	1	1	3	
		36	1,255	1	1	–	
		37	1,222	1	1	1	
		38	1,105	1	1	–	
		39	1,642	1	1	–	
		40	1,642	1	1	1	
		41	2,248	1	1	4	
		42	1,952	1	1	–	
		43	1,935	1	1	–	
		44	2,688	1	–	–	Battery Serjeant Major.
		45 46	4,587	1	1	4	Master Gunner.
		47	2,074	1	–	2	Master Tailor.
Royal Engineers -	Hargraves* - - -	—	1,960	1	1	–	Attached to barrack, four married quarters, not ordinary barrack rooms.
		—	2,700	1	1	–	
		—	3,655	1	1	1	
		—	5,390	1	2†	1	
	Town Range* - -	—	1,655	1	1	1	Three married quarters, not ordinary barrack rooms.
		—	2,039	1	1	1	
		—	2,194	1	1	1	
	Building, partly wooden, South Sheds - -	—	3,807	1	1	1	
	Crutchetts Ramp, stone building - -	—	3,480	1	1	3	Six separate buildings, each occupied by a different family.
		—	3,480	1	1	4	
		—	2,118	1	1	2	
		—	2,278	1	1	2	
		—	2,278	1	1	1	
		—	2,278	1	1	1	

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* The buildings marked thus * are Government buildings, the remainder have been built at different periods by the men of the corps.

† 1 servant.

B.—Number of Wooden Huts or other Buildings, &c.—*continued.*

Corps.	Whether Hut or Building.	No. of Hut or Building.	Dimensions with cubic Contents.	Occupied by			Remarks.
				No. of Men.	No. of Women.	No. of Children.	
			cubic feet.				
Royal Engineers	Engineer building*	—	4,847	1	–	–	Schoolmaster.
	Prince Edward's Ramp, stone building	—	2,673	1	1	2	Three separate buildings, each occupied by different families.
				1	1	1	
				1	1	–	
	Prince Edward's Road, stone building	—	1,763	1	1	1	
	George's Street, stone building*	—	3,366	1	1	4	
		—	3,366	–	1	1	Schoolmistress.
	Sandpit, stone building	—	2,035	1	1	–	
	North Front, stone buildings	—	1,926	1	1	1	Ten separate buildings, each occupied by a different family.
		—	1,152	1	1	1	
		—	1,152	1	1	1	
		—	2,010	1	1	1	
		—	862	1	1	–	
		—	2,100	1	1	1	
		—	1,548	1	1	1	
		—	3,108	1	1	–	
		—	1,440	1	1	1	
		—	743	1	1	1	
	Commanding Royal Engineer's lodge, stone building	—	1,693	1	1	–	
	Buena Vista, stone buildings	—	3,842	1	1	–	Four separate buildings, each occupied by different families.
		—	2,968	1	1	–	
		—	12,057	1	1	1	
		—	1,872	1	1	1	
2nd Batt. 6th Regiment.	Building	—	3,775	1	1	2	Serjeant Major.
	"	—	2,575	1	1	4	Quartermaster Serjeant.
	"	—	2,935	1	1	–	Armourer Serjeant.
	Hut	1	4,295	3	3	2	
	"	2	4,295	3	3	7	
	"	4	4,295	3	3	5	
	"	6	4,295	3	3	2	
	"	7	4,295	2	2	4	
	"	8	4,295	2	2	4	
	"	9	4,295	2	2	3	
	"	10	4,295	3	3	2	
	"	11	4,295	2	2	2	
	"	12	4,295	2	2	3	
	"	14	4,295	2	2	5	
	"	15	4,295	3	3	5	
	At Catelan Bay	-	-	1	1	1	On detachment.
	2 schoolmasters	-	-	2	2	5	Provided with special quarters.
2nd Batt. 7th Regiment.	Huts.						
	Hut, Europa	1	No. 1, 1,708 No. 2, 1,708	2	2	3	Non commissioned officer's rooms between barrack rooms.
	"	2	1,944 1,687	1	1	–	
	"	3	1,708 1,708	1	1	–	
	"	4	1,708 1,708	2	2	–	
	"	5	1,708 1,708	2	2	1	
	"	6	1,708 1,708	2	2	2	
	"	7	1,708 1,708	1	1	2	
	"	8	1,708 1,708	2	2	–	
	Wood Hut, Europa	1	2,071 each	1	1	–	
	"	5	2,071 room	2	2	2	
	Servants kitchen, Europa hospital	5	3,114 3,114	1	1	–	
	Europa Pass	1	9,347	4	4	5	
	Hut, Europa Pass	2	9,372	4	4	5	
	"	3	9,091	4	4	2	
	"	4	7,609	4	4	7	
	"	5	21,820	5	5	4	
	"	8	9,438	5	5	11	
	Hut, Buena Vista	3	1,553	1	1	1	Non-commissioned officer's room between barrack rooms.
	Buildings.						
	Kitchen, Buena Vista	2	1,230	1	1	2	At officers' quarters.
	Kitchen, Buena Vista	3	1,230	1	1	–	
	N.C.O. room Buena Vista	1	1,620	1	1	1	
	"	2	1,620	1	1	–	
	Room, Naval hospital	6	5,036	1	1	2	
	Porter's lodge, do.	—	2,527	1	1	2	
	North Front	—	—	1	1	1	
	District school, Windmill Hill Road	—	5,572	1	1	2	
	5 tents at Buena Vista	—	1,233 each.	5	5	4	
2nd Batt. 8th Regiment.	Building	2	3,185	1	1	1	Serjeant's room.
	"	4	3,185	1	1	2	Ditto.
	"	1	2,862	1	1	4	Staff Serjeant's room.
	Kitchen	—	940	—	1	—	Ditto.
	Building	—	4,452	1	1	1	Schoolmaster.
	"	—	2,540	1	1	2	Armourer Serjeant.

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* The buildings marked thus * are Government buildings, the remainder have been built at different periods by the men of the corps.

B.—Number of Wooden Huts or other Buildings, &c.—*continued.*

Corps.	Whether Hut or Building.	No. of Hut or Building.	Dimensions with cubic Contents.	Occupied by			Remarks.
				No. of Men.	No. of Women.	No. of Children.	
			cubic feet.				
2nd Batt. 8th Regiment.	Building - - -	6	1,799	1	1	1	Servants' room.
	„ - - -	7	1,799	1	1	2	Ditto.
	„ - - -	9	1,799	1	1	–	Ditto.
	„ - - -	11	1,799	1	1	3	Ditto.
	„ - - -	16	1,799	1	1	–	Ditto.
	Building, Bayside guard room	—	2,560	1	1	2	Guard room.
	Building, servants' room -	—	2,560	1	1	–	Servants' room.
1st Batt. 25th Regiment.	Building - - -	2	2,903	1	1	4	Non-commissioned officers' quarters in rear of South barracks.
	„ - - -	3	1,954	1	1	–	
	„ - - -	4	1,954	1	1	–	
	„ - - -	5	2,182	1	1	1	
	„ - - -	6	2,225	1	1	1	
	„ - - -	7	2,131	1	1	1	
	„ - - -	8	3,022	1	1	2	
	„ - - -	9	3,064	1	1	2	
	„ (serjeant-major)	10 & 11	4,504	1	1	–	
	„ - - -	12	1,514	1	1	1	
	„ - - -	13	1,514	1	1	2	
	„ - - -	15	1,633	1	1	3	
	„ - - -	16	1,633	1	1	1	
	„ - - -	18	1,534	1	1	1	
	„ - - -	19	1,514	1	1	3	
	„ - - -	20	1,543	1	1	2	
	„ - - -	21	1,973	1	1	1	
	„ - - -	22	1,660	1	1	1	
	„ - - -	24	1,336	1	1	–	
	„ - - -	25	4,361	1	1	5	
	„ - - -	—	—	1	1	–	Provision store, Rosia.
	„ - - -	—	—	1	1	3	Shoemakers' shop, Rosia.
	Stone building - -	—	—	1	1	1	Old Serjeants' mess.
	„ - - -	2	—	1	1	2	
	„ - - -	3	—	1	1	2	
	Building - - -	3	8,600	5	5	6	Sheds, Buena Vista.
	„ - - -	4	8,600	5	5	7	
	„ - - -	5	14,560	9	9	11	
100th Regiment -	Hut, North Front - -	1	2,986	3	3	6	
	„ - - -	2	2,986	3	3	4	
	„ - - -	3	2,986	3	3	6	
	„ - - -	4	2,986	2	2	6	
	„ - - -	5	2,986	3	3	4	
	„ - - -	6	2,986	3	3	6	
	Tents, North Front - -	1	1,853	1	1	1	
	„ - - -	2	1,853	1	1	2	
	„ - - -	3	1,853	1	1	2	
	Building, Casemate - -	—	4,372	1	1	2	Serjeant Major.
	„ - - -	—	2,600	1	1	3	Quartermaster Serjeant.
	„ - - -	—	1,270	1	1	3	Library.
	„ - - -	—	4,260	1	1	1	Tailors' shop.
	„ - - -	3	1,822	1	1	1	Non-commissioned officers' quarters.
	„ - - -	4	1,822	1	1	–	
	„ - - -	5	1,822	1	1	2	
	„ - - -	7	1,822	1	1	–	
	„ - - -	12	1,455	1	1	1	
	„ - - -	—	5,577	1	1	2	Schoolmistress.
	Retrenchment barrack -	12 13	7,552	1	1	–	Bandmaster.

C. Estimate of the Numbers of Married Non-commissioned Officers and Soldiers for whom separate provision would be necessary in the event of the existing accommodation in Barrack-rooms, Huts, and other buildings being withdrawn, the object being to ascertain what Numbers of Quarters of a separate room each, is required to meet the necessities of the Garrison.

1.—*Royal Artillery.*

If the existing accommodation in barrack rooms, huts, &c., were withdrawn, the number of quarters of a separate room each required by the Royal Artillery would be (cottages excluded), 43.

2.—*Royal Engineers.*

Should the whole of the existing accommodation, except that in Hargraves and Town Range barracks, be withdrawn, 26 quarters would be required; but should that also be withdrawn, 33 quarters would be required.

3.—*2nd Battalion 6th Regiment.*

—	1st Class Staff Serjeants.	2nd Class Staff Serjeants.	3rd Class Staff Serjeants.	N. C. Officers, Rank and File.	Total Married.
Required for the present effective strength excluding schoolmasters.	2	3	—	29	34

By War Office Circular, No. 318, dated 17th Sept. 1858, the following numbers are permitted to be borne on the establishment of corps serving with regiments abroad, viz. :—

—		1st Class Staff Serjeants.	2nd Class Staff Serjeants.	3rd Class Staff Serjeants.	N. C. Officers, Rank and File.	Total Wives authorized.
Class A.	Serjeant Major -	1	–	–	–	1
	Quartermaster Serj.-	1	–	–	–	1
	Serjeant Instructor of Musketry -	1	–	–	–	1
Class B.	Paymaster Serj. -	–	1	–	–	1
	Armourer Serjeant -	–	1	–	–	1
	Hospital Serjeant * -	–	1	–	–	1
	Orderly Room Serjt.	–	1	–	–	1
	Drum Major - -	–	1	–	–	1
10 Companies, with 2 Serjeants' wives each - - -		–	–	–	20	20
800 Rank and File, 6 women per cent. - - - -		–	–	–	48	48
Number of separate quarters required for the authorized establishment, excluding schoolmasters and unmarried colour serjeants -		3	5	–	68	76

* The 2nd Battalion 6th Regiment has no hospital serjeant.

Schoolmasters are exclusive from the above, being provided with special quarters.

By Circular No. 698, dated War Office, 27th July 1861, colour serjeants of infantry are classed with 2nd class staff serjeants, for allowances of fuel and light, &c., and are entitled to a separate room each; as some of them are generally unmarried (in this battalion only two of the eight serjeants have wives), it will follow that a regiment having its full establishment of married non-commissioned officers and soldiers will require not less *than eighty* separate rooms for their accommodation.

4.—*2nd Battalion, 7th Regiment.*

Seventy-five. (75).

5.—*2nd Battalion, 8th Regiment.*

Staff Serjeants - - -	7
Serjeants, 2 per company - - -	20
Drummers, rank and file, 6 per cent. on establishment - - - -	49

6.—1*st Battalion, 25th Regiment.*

For the service companies of a battalion:—

Serjeants.	Drummers.	R. & File.	Total.
47	20	800	867

Number of Staff Serjeants.	Other Serjeants, at the rate of two per Company.	Drummers, and Rank and File, at the rate of six per cent.	Number of separate rooms necessary for the married N.C.O. and soldiers of a Battalion.
7	20	49	76

Remarks.—Vide W. O. Circular, No. 419, 29th April 1859.

7.—100*th Regiment.*

1st Class Staff Serjeants	5	Serjeant Major. Quartermaster Serjeant. Serjeant Instructor of Musketry. Schoolmaster. Schoolmistress.
2nd „	- 4	Drum Major. Armourer Serjeant. Colour Serjeant McCarthy. Colour Serjeant Hudson.
Serjeants	- 7	
Rank and File	35	
Total	51	Present strength at head quarters.

Total number allowed for establishment of regiment, vide W. O. Circular of 29th April 1859, No. 419 $\frac{2656}{21}$.

77 of all ranks.

True copies from Returns furnished by regiments and corps.

Gibraltar,
4th November 1861.

H. H. Maude,
A. A. G.

No. 1.—MONTHLY ABSTRACT of METEOROLOGICAL OBSERVATIONS made by the ROYAL ENGINEER DEPARTMENT, MALTA, 1859.

Latitude 35° 53′ 49″ N., longitude 14° 30′ 28″ E.; station 232 feet above the sea.

—	—	Barometer.		Thermometer.				Hygrometer.						Self-registering Thermometers.						Rain.		Wind.					Cloud.		Maxima and Minima of Month.	
		Inches.	Inches.	Temp. in Air.		Temp. of Evap.		Temp. of Dew-point.		Elas. Forcc of Evap.		Humidity 0–1.		Max. Sun.	Min. Gras.	Max. Air.	Min. Air.	Max. Wet.	Min. Wet.	Inches in 24 hours.		Pres. in lbs. per Sq. Foot.		Direction—Times.			0–10.			
		9½ AM.	3½ PM.	9½AM	3½ PM.	9½AM.	3½ PM.	9½AM.	3½ PM.	9½AM.	3½ PM.	9½AM.	3½ PM.							On Ground.	Above Ground.	9½ A.M.	3½ PM.	—	9½AM.	3½ PM.	9½AM.	3½ PM.	Temp.	Rain.
January	Max.	30·313	30·251	60·	60·	57·	56·	54·6	54·6	·441	·437	·934	·934	83·	49·	63·	54·	59·	51·	1·900	1·950	3·00	3·25	N. N.W. W. S.W. S. S.E. E. N.E.	4 1 3 2 1 2 8 10	3 0 4 1 1 2 8 12	10	10	Max. = 65° on 31st. Min. = 45° on 9th. Range = 20°.	Total fall = 6·810 inch. Max. in 24 h. = 1·9 inch on 26th.
	Mean	29·944	29·923	54·6	55·5	51·2	51·8	48·5	48·2	·356	·361	·815	·802	67·6	43·	57·7	49·8	55·5	41·	·220	·213	·53	·67				8	7		
	Min.	29·548	29·553	50·	52·	46·	48·	42·	43·	·283	·283	·665	·665	55·	32·	55·	45·	51·	42·	·000	·000	·000	·000				1	1		
February	Max.	30·124	30·077	63·	64·	59·	59·	56·2	55·2	·461	·450	·944	·888	85·	49·	65·	56·	60·	52·	·805	·800	2·00	4·50	N. N.W. W. S.W. S. S.E. E. N.E.	4 7 3 4 4 2 1 3	2 7 6 2 4 2 0 5			Max. = 65° on 1st. Min. = 39° on 21st. Range = 26°.	Total rain = 2·256 inch. Max. = ·803 in on 16th.
	Mean	29·784	29·746	56·	57·2	52·3	52·9	49·4	49·8	·371	·376	·804	·784	71·1	40·9	59·5	49·	56·6	46·9	·080	·078	·49	·68							
	Min.	29·395	29·376	42·	46·	39·	41·	35·4	35·7	·225	·226	·668	·665	60·	31·	50·	39·	45·	35·	·000	·000	·000	·000							
March	Max.	30·213	30·181	65·	66·	62·	62·	60·2	59·6	·527	·516	·944	·944	84·	50·	68·	59·	63·	56·	·300	·285	3·25	3·75	N. N.W. W. S.W. S. S.E. E. N.E.	2 10 5 1 2 5 3 3	3 6 8 3 3 2 4 2	10	10	Max. = 68° on 10th. Min. = 46° on 2nd. Range = 22°.	Total rain = 1·32 inch. Max. = ·300 in. on 21st.
	Mean	29·835	29·792	59·3	60·8	58·8	56·5	53·1	53·1	·420	·423	·817	·729	73·5	42·9	62·7	53·	59·	50·2	·042	·038	·79	·72				5	5		
	Min.	29·411	29·254	48·	54·	46·	48·	43·8	43·1	·302	·295	·666	·665	61·	38·	58·	46·	56·	41·	·000	·000	·000	·000				0	0		
April	Max.	30·111	30·020	84·	88·	70·	73·	66·0	66·0	·638	·638	·893	·854	100·	51·	93·	69·	74·	62·	·125	·115	4·00	3·5	N. N.W. W. S.W. S. S.E. E. N.E.	0 7 7 5 2 2 5 2	1 9 4 4 5 1 5 1	10	10	Max. = 93° on 21st. Min. = 48° on 3rd. Range = 45°.	Total rain = ·175 inch. Max. = ·125 in. on 13th.
	Mean	29·744	29·705	66·	68·	61·	62·	57·5	57·0	·484	·509	·752	·728	82·6	42·9	71·9	57·	63·6	54·	·006	·005	·79	·69				4	4		
	Min.	29·338	29·307	54·	54·	47·	50·	40·0	51·0	·264	·316	·482	·487	66·	35·	59·	48·	55·	44·	·000	·000	·000	·000				0	0		
May	Max.	29·802	29·796	75·	82·	69·	72·	66·0	70·5	·638	·739	·897	·865	94·	61·0	79·	65·	72·	62·	·200	·190	5·50	7·50	N. N.W. W. S.W. S. S.E. E. N.E.	5 10 1 3 2 1 5 4	3 10 3 3 0 3 4 5	10	10	Max. = 79° on 27th. Min. = 57° on 7th. Range 22°.	Total rain = ·325 inch. Max. = ·200 in. on 8th.
	Mean	29·636	29·622	68·5	70·	64·	65·3	62·0	62·6	·553	·572	·798	·775	83·9	47·1	73·	61·	66·	59·	·010	·009	·95	·78				4	4		
	Min.	29·342	26·319	64·	62·	59·	59·	58·4	56·9	·450	·472	·709	·618	71·	36·	67·	57·	62·	54·	·025	·015	·25	·25				0	0		
June	Max.	29·929	29·925	83·	86·	74·	75·	72·	70·	·776	·727	·907	·823	104·	66·	87·	70·	78·	67·	—	—	6·0	7·50	N. N.W. W. S.W. S. S.E. E. N.E.	1 16 2 1 0 4 3 3	0 12 6 3 0 4 1 4			Max. = 87° on 16th & 30th. Min. = 61° on 6th. Range = 26°.	None.
	Mean	29·767	29·744	74·9	77·8	69·2	69·9	66·2	65·9	·646	·638	·758	·718	92·4	60·5	79·8	65·9	72·5	63·	—	—	·90	1·48							
	Min.	29·500	29·512	69·	72·	62·	66·	57·8	61·	·486	·541	·588	·559	84·	49·	74·	61·	69·	59·	—	—	—	—							

MONTHLY ABSTRACT of METEOROLOGICAL OBSERVATIONS made by the ROYAL ENGINEER DEPARTMENT, 1859—*continued.*

—	—	Barometer.		Thermometer.				Hygrometer.						Self-registering Thermometers						Rain.		Wind.					Cloud.		Maxima and Minima of Month.	
		Inches.	Inches.	Temp. in Air.		Temp. of Evap.		Temp. of Dew-point.		Elas. Force of Evap.		Humidity 0—1.		Max. Sun.	Min. Gras.	Max. Air.	Min. Air.	Max. Wet.	Min. Wet.	Inches in 24 hours.		Pres. in lbs. per Sq. Foot.		Direction—Times.			0—10.		Temp.	Rain.
		9½ AM.	3½ PM.	9½ AM.	3½ PM.	9½ AM.	3½ PM.	9½ AM.	3½ PM.	9½ AM.	3½ PM.	9½ AM.	3½ PM.							On Ground.	Above Ground.	9½ AM.	3½ PM.	—	9½ AM.	3½ PM.	9½ AM.	3½ PM.		
July	Max.	29·944	29·949	89·	91·	79·	81·	75·	75·6	·854	·910	·787	·785	108·	70·	93·	75·	81·	71·	—	—	1·75	3·50	N.	5	4	7	7	Max. = 93° on 7th. Min. = 66° on 1st, 19th, and 30th. Range = 27°.	None.
	Mean	29·802	29·777	81·9	84·6	74·4	75·2	70·5	70·4	·746	·741	·698	·640	99·4	65·1	86·	70·5	77·3	68·	—	—	·33	·56	N.W.	13	7	1·8	2		
	Min.	29·657	29·629	75·	78·	69·	71·	65·5	66·	·628	·638	·535	·535	87·	58·	79·	66·	74·	64·	—	—	·00	·00	W.	1	5	0	0		
																								S.W.	0	2				
																								S.	0	1				
																								S.E.	0	1				
																								E.	1	0				
																								N.E.	11	11				
August	Max.	29·846	29·820	87·	90·	80·	81·	77·5	78·	·925	·940	·789	·753	110·	70·	93·	77·	85·	75·	·065	·055	1·50	3·	N.	5	4	10	9	Max. = 93° on 31st. Min. = 68° on 27th. Range = 25°.	Total rain = ·065 in. on 24th. Maltese fever very prevalent.
	Mean	29·739	29·707	83·6	86·4	76·9	77·5	73·5	73·	·819	·804	·727	·654	102·7	67·	88·	73·	80·	71·	·002	·002	·15	·33	N.W.	10	3	3	2		
	Min.	29·587	29·528	79·	82·	71·	70·	70·	64·	·680	·597	·680	·559	95·	60·	83·	68·	76·	66·	·000	·000	·000	·25	W.	4	5	0	0		
																								S.W.	2	2				
																								S.	1	0				
																								S.E.	3	3				
																								E.	1	1				
																								N.E.	5	13				
September	Max.	30·026	29·988	81·	83·	75·	74·	73·	71·	·801	·751	·825	·786	102·	69·	87·	76·	81·	72·	·135	·125	2·50	3·75	N.	1	1	10	10	Max. = 87° on 1st. Min. = 63° on 21st. Range = 24°.	Total rain = ·250 in. Max. = ·135 in. on 19th.
	Mean	29·803	29·779	77·5	79·	71·3	71·5	67·6	67·	·677	·673	·729	·694	94·	59·6	80·	68·	74·9	65·2	·115	·105	·55	·76	N.W.	13	7	3	3		
	Min.	29·517	29·511	73·	74·	65·	65·	58·	60·5	·532	·532	·610	·614	84·	54·	75·	63·	69·	69·	·008	·007	·25	·25	W.	2	4	1	1		
																								S.W.	1	1				
																								S.	4	4				
																								S.E.	0	0				
																								E.	1	0				
																								N.E.	8	13				
October	Max.	30·053	30·038	82·	87·	75·	79·	72·5	75·	·787	·854	·824	·786	107·	68·	89·	78·	88·	71·	—	—	3·75	1·75	N.	1	3	10	10	Max. = 89° on 11th. Min. = 64° on 27th. Range = 25°.	Slight showers too little to register.
	Mean	29·798	29·761	77·4	78·2	71·6	70·8	68·6	67·3	·753	·665	·757	·710	97·4	57·9	81·5	69·3	76·6	65·	—	—	·37	·33	N.W.	9	9	4	4		
	Min.	29·616	29·615	74·	72·	67·	65·	63·5	61·5	·588	·550	·678	·559	88·	50·	76·	64·	72·	61·	—	—	·0	·0	W.	4	2	0	0		
																								S.W.	8	6				
																								S.	3	4				
																								S.E.	2	1				
																								E.	0	1				
																								N.E.	4	5				
November	Max.	29·998	29·962	76·	77·	70·	72·	67·5	67·5	·670	·715	·946	·944	100·	—	79·	68·	76·	65·	1·650	1·850	5·50	8·	N.	0	0	10	10	Max. = 79° on 6th. Min. = 50° on 19th. Range = 29°.	Total rain = 6·015 in. Max. = 1·650 in. on 15th.
	Mean	29·753	29·728	62·2	66·7	62·2	62·4	59·8	58·2	·527	·527	·816	·806	82·9	—	69·8	60·7	68·	57·4	·220	·206	1·25	1·20	N.W.	8	7	7	7		
	Min.	29·266	29·281	52·	57·	51·	55·	50·	53·2	·388	·416	·619	·643	70·	—	61·	50·	60·	48·	·015	·015	·25	·25	W.	3	2	2	1		
																								S.W.	2	2				
																								S.	2	3				
																								S.E.	6	2				
																								E.	1	3				
																								N.E.	8	11				
December	Max.	29·984	30·016	65·	65·	62·	62·	60·2	60·2	·527	·527	·944	·944	92·	—	67·	63·	66·	59·	·600	·600	7·50	6·00	N.	3	3	10	10	Max. = 67° on 1st, 2nd, 7th, and 20th. Min. = 44° on 17th. Range = 23°.	Total rain = 3·130 in. Max. = ·600 in. on 25th.
	Mean	29·743	29·718	58·	58·1	54·2	53·7	51·2	50·5	·396	·384	·799	·776	71·4	—	61·4	52·9	59·7	49·1	·100	·096	1·41	1·21	N.W.	9	6	6	7		
	Min.	29·424	29·373	51·	48·	47·	45·	41·	39·7	·274	·262	·662	·591	62·	—	53·	44·	55·	41·	·015	·015	·25	·25	W.	6	6	1	2		
																								S.W.	6	8				
																								S.	0	0				
																								S.E.	2	2				
																								E.	1	0				
																								N.E.	4	6				

No. 2.—MONTHLY ABSTRACT of METEOROLOGICAL OBSERVATIONS made by the ROYAL ENGINEER DEPARTMENT, MALTA, 1860.

Latitude 35° 53′ 49″, longitude 14° 30′ 28″ E.; Station 232 feet above the sea.

—	—	Barometer. Inches. 9½ A.M.	Barometer. Inches. 3½ P.M.	Thermometer. Temp. in Air. 9½ A.M.	Thermometer. Temp. in Air. 3½ P.M.	Thermometer. Temp. of Evap. 9½ A.M.	Thermometer. Temp. of Evap. 3½ P.M.	Hygrometer. Temp. of Dew-point. 9½ A.M.	Hygrometer. Temp. of Dew-point. 3½ P.M.	Hygrometer. Elas. Force of Evap. 9½ A.M.	Hygrometer. Elas. Force of Evap. 3½ P.M.	Hygrometer. Humidity 0—1. 9½ A.M.	Hygrometer. Humidity 0—1. 3½ P.M.	Self-registering Thermometers. Max. Sun.	Min. Gras.	Max. Air.	Min. Air.	Max. Wet.	Min. Wet.	Rain. Inches in 24 hours. On Ground	Rain. Inches in 24 hours. Above Ground.	Wind. Pres. in lbs. per Sq. Foot. 9½ A.M.	Wind. Pres. in lbs. per Sq. Foot. 3½ P.M.	Cloud. 0—10. 9½ A.M.	Cloud. 0—10. 3½ P.M.	Maxima and Minima of Month. Temp.	Maxima and Minima of Month. Rain.
January	Max.	30·175	30·142	63·	66·	60·	62·	57·6	60·2	·488	·527	·893	·944	92·	—	69·	59·	69·	55·	·250	·250	6·	4·50	10	10	Max. = 69° on 7th. Min. = 48° on 18th. Range = 21°.	Total fall = ·875 inch. Max. in 24 hours = ·250 in. on 22nd.
	Mean	29·873	29·836	58·	59·	54·	55·	52·2	52·1	·404	·414	·813	·794	72·	—	61·	54·	60·	50·	·028	·024	·89	·97	5	6		
	Min.	29·521	29·504	54·	52·	51·	49·	47·5	44·8	·335	·312	·747	·710	64·	—	57·	48·	53·	45·	·015	·015	·25	·25	1	2		
February	Max.	30·057	29·937	62·	62·	59·	60·	56·9	57·6	·472	·483	·931	·891	88·	—	65·	58·	75·	54·	·425	·450	11·	9·			Max. = 65° on 3rd. Min. = 40° on 22nd. Range = 25°.	Total fall = 1·725 inch. Max. in 24 hours = ·425 in. on 24th.
	Mean	29·614	29·586	54·	56·	51·	52·	48·4	48·6	·358	·359	·813	·773	71·	—	59·	50·	59·	45·	·059	·052	1·93	2·47	6	6		
	Min.	29·299	29·316	44·	49·	44·	46·	41·0	40·0	·238	·264	·615	·662	61·	—	55·	40·	53.	30·	·035	·025	·25	·25				
March	Max.	30·041	30·040	65·	67.	61·	63·	58·6	60·6	·499	·534	·893	·944	88·	—	75·	59·	66·	57·	·200	·175	4·50	4·50	10	10	Max. = 75° on 31st. Min. = 45° on 7th. Range = 30°.	Total fall = 1·150 inch. Max. in 24 hours = ·200 in. on 19th.
	Mean	29·696	29·660	57·	58.	53·	54·	50·7	51·0	·388	·397	·810	·780	74·	—	61·	51·	59·	48·	·037	·030	·91	1·14	6	5		
	Min.	29·334	29·317	50·	52·	49·	48·	43·	43·1	·293	·295	·687	·665	62·	—	55·	45·	53·	42·	·000	·000	—	—				
April	Max.	29·890	29·862	71·	72·	67·	67·	65·8	64·5	·634	·607	·902	·853	89·	—	76·	63·	71·	59·	·094	·075	3·50	4·50	10	10	Max. = 76° on 28th. Min. = 50° on 25th. Range = 26°.	Total fall = ·140 inch. Max. in 24 hours = ·094 in. on 13th.
	Mean	29·684	29·647	63·	63·	59·	59·	55·0	56·4	·478	·468	·816	·784	78·	—	66·	55·	63·	53·	·004	·003	1·05	1·17	5	5		
	Min.	29·414	29·401	53·	56·	51·	54·	49·0	49·8	·361	·371	·711	·751	70·	—	59·	50·	59·	47·	·045	·035	·28	·25				
May	Max.	29·948	29·912	77·	81·	69·	70·	66·	64·5	·638	·607	·898	·898	104·	—	84·	64·	74·	61·	·115	·100	3·25	3·50	9	9	Max. = 84° on 12th. Min. = 53° on 5th. Range = 31°.	Total fall = ·255 inch. Max. in 24 hours = ·115 in. on 23d.
	Mean	29·745	29·732	68·	70·	63·	64·	60·3	61·0	·531	·544	·774	·737	90·	—	73·	59·	67·	57·	·008	·006	·50	·78	3	4		
	Min.	29·466	29·513	58·	60·	55·	57·	59·2	54·2	·412	·431	·676	·585	79·	—	64·	53·	60·	52·	·040	·030	·25	·25	1	1		
June	Max.	29·912	29·858	87·	90·	76·	77·	71·5	72·	·763	·776	·786	·748	110·	—	93·	75·	81·	69·	—	—	2·00	2·50	8	10	Max. = 93° on 29th. Min. = 61° on 1st. Range = 32°.	No rain.
	Mean	29·750	29·725	78·	81·	70·	72·	67·3	67·6	·668	·675	·709	·650	98·	—	83·	67·	74·	64·	—	—	·20	·18	2	2		
	Min.	29·570	29·442	74·	76·	66·	66·	63·0	61·0	·559	·541	·591	·512	90·	—	78·	61·	70·	59·	—	—	·25	·25	1	1		

—	Wind. Direction—Times. —	Wind. Direction—Times. 9½ A.M.	Wind. Direction—Times. 3½ P.M.
January	N.	1	2
	N.W.	10	10
	W.	5	7
	S.W.	6	4
	S.	1	1
	S.E.	4	·5
	E.	1	—
	N.E.	3	2
February	N.	3	—
	N.W.	8	9
	W.	8	5
	S.W.	5	9
	S.	2	1
	S.E.	—	1
	E.	1	1
	N.E.	2	3
March	N.	1	2
	N.W.	12	10
	W.	7	7
	S.W.	2	4
	S.	1	3
	S.E.	2	1
	E.	—	1
	N.E.	6	3
April	N.	1	2
	N.W.	9	11
	W.	3	5
	S.W.	3	3
	S.	3	2
	S.E.	6	4
	E.	2	—
	N.E.	3	3
May	N.	4	3
	N.W.	15	14
	W.	3	5
	S.W.	2	2
	S.	3	3
	S.E.	2	3
	E.	1	—
	N.E.	1	1
June	N.	7	1
	N.W.	6	8
	W.	—	1
	S.W.	—	1
	S.	—	—
	S.E.	9	7
	E.	3	4
	N.E.	5	8

MONTHLY ABSTRACT of METEOROLOGICAL OBSERVATIONS made by the ROYAL ENGINEER DEPARTMENT, 1860—*continued.*

—	—	Barometer. Inches.	Barometer. Inches.	Thermometer. Temp. in Air.		Thermometer. Temp. of Evap.		Hygrometer. Temp. of Dew-point.		Hygrometer. Elas. Force of Evap.		Hygrometer. Humidity 0—1.		Self-registering Thermometers. Max. Sun.	Min. Gras.	Max. Air.	Min. Air.	Max. Wet.	Min. Wet.	Rain. Inches in 24 hours. On Ground.	Above Ground.	Wind. Pres. in lbs. per Sq. Foot.		Cloud. 0—10.		Maxima and Mimima of Month. Temp.	Rain.
		9½ AM.	3½ PM.	9½ AM.	3½ PM.	½ AM.	3½ PM.	9½ AM.	3½ PM.	9½ AM.	3½ PM.	9½ AM.	3½ PM.									9½ AM.	3½ PM.	9½ AM.	3½ PM.		
July - - -	Max. -	29·828	28·806	86·	88·	77·	78·	74·0	74·0	·827	·827	·826	·824	108·	—	92·	75·	82·	73·	—	—	2·00	2·75	10	10	Max. = 92° on 1st. Min. – 67° on 6th. Range = 25°.	No rain.
	Mean -	29·687	29·671	79·	83·	71·	72·	68·2	68·0	·698	·680	·709	·643	95·	—	83·	70·	77·	68·	—	—	·66	·87	1	1		
	Min. -	29·473	29·485	74·	72·	66·	67·	62·0	62·0	·617	·559	·589	·487	85·	—	76·	67·	73·	64·	—	—	·25	·25	1	1		
August - -	Max. -	29·903	29·834	97·	93·	83·	83·	79·5	79·4	·986	·986	·788	·788	119·	—	101·	82·	89·	76·	—	—	1·50	·75	9	9	Max. = 101° on 17th. Min. – 66° on 2nd. Range = 35°.	No rain.
	Mean -	29·773	29·742	83·	85·	76·	78·	72·1	72·3	·751	·788	·709	·655	102·	—	88·	73·	81·	70·	—	—	·20	·22	1	1		
	Min. -	29·658	29·626	76·	78·	67·	70·	62·5	66·0	·568	·638	·563	·537	89·	—	79·	66·	73·	64·	—	—	·25	·25	1	1		
September - -	Max. -	30·288	30·022	93·	99·	84·	89·	80·4	85·0	·988	1·180	·827	·870	120·	—	100·	80·	89·	78·	—	—	2·50	5·50	7	9	Max. = 100° on 18th. Min. = 65° on 23rd and 24th. Range=35°.	No rain.
	Mean -	29·825	29·783	82·	84·	76·	76·	72·7	72·8	·804	·801	·742	·720	97·	—	86·	72·	80·	70·	—	—	·40	·72	3	3		
	Min. -	29·606	29·613	76·	75·	67·	67·	60·0	63·0	·559	·578	·613	·591	9·	—	77·	65·	68·	63·	—	—	·25	·25	1	1		
October - -	Max. -	30·034	30·016	89·	90·	78·	80·	77·1	75·0	·882	·854	·867	·865	116·	68·	92·	74·	84·	71·	·875	1·095	3·	6·50	9	9	Max. = 92° on 3rd. Min. = 59° on 12th and 15th. Range = 33°.	Total fall = 1·805 inch. Max. in 24 hours = ·875 inch. on 5th.
	Mean -	29·866	29·824	74·	75·	68·	68·	66·0	67·6	·641	·636	·763	·740	93·	62·	78·	65·	75·	62·	·060	·070	·43	·70	4	5		
	Min. -	29·541	29·517	69·	70·	61·	63·	56·2	57·5	·461	·481	·565	·619	82·	49·	73·	59·	67·	55·	·035	·045	·25	·25	1	1		
November - -	Max. -	29·934	29·900	71·	74·	68·	70·	67·0	68·0	·659	·681	·907	·907	100·	61·	77·	67·	74·	63·	·830	·850	6.	3·25	10	10	Max. = 77° on 14th and 27th. Min. = 52° on 20th. Range = 25°.	Total fall = 1·720 inch. Max. in 24 hours = ·830 inch. on 4th.
	Mean -	29·750	29·694	66·	67·	62·	62·	59·3	60·1	·518	·533	·784	·781	82·	54·	70·	60·	68·	57·	·057	·061	·74	·80	5	6		
	Min. -	29·505	29·470	58·	59·	53·	54·	48·1	49·1	·350	·362	·668	·668	71·	42·	61·	52·	59·	46·	·015	·015	·25	·25	2	2		
December - -	Max. -	29·916	29·882	68·	69·	63·	65·	60·2	61·6	·499	·570	·851	·853	93·	59·	75·	64·	70·	60·	·400	·450	8·	5·			Max. = 75° on 1st. Min. = 47° on 30th. Range = 28°.	Total fall = 1·690 inch. Max. in 24 hours = ·400 inch. on 17th.
	Mean -	29·638	29·612	60·	61·	56·	56·	52·7	53·3	·415	·423	·766	·766	74·	48·	64·	54·	63·	50·	·054	·057	1·46	1·40	6	6		
	Min. -	29·204	29·229	50·	52·	46·	47·	38·0	40·2	·246	·283	·576	·632	65·	39·	55·	47·	50·	42·	·015	·015	·25	·25				

—	Wind. Direction—Times. —	9½ AM.	3½ PM.
July - - -	N.	4	5
	N.W.	17	14
	W.	2	4
	S.W.	—	3
	S.	1	—
	S.E.	2	1
	E.	1	2
	N.E.	4	2
August - -	N.	9	8
	N.W.	7	5
	W.	3	2
	S.W.	—	1
	S.	3	3
	S.E.	1	—
	E.	—	—
	N.E.	8	12
September - -	N.	5	3
	N.W.	7	7
	W.	3	3
	S.W.	3	3
	S.	1	1
	S.E.	7	6
	E.	1	—
	N.E.	3	7
October - -	N.	1	2
	N.W.	8	9
	W.	2	1
	S.W.	1	2
	S.	2	2
	S.E.	4	5
	E.	8	6
	N.E.	4	4
November - -	N.	2	1
	N.W.	9	7
	W.	1	4
	S.W.	2	3
	S.	6	5
	S.E.	7	8
	E.	1	—
	N.E.	2	2
December - -	N.	1	—
	N.W.	12	9
	W.	5	12
	S.W.	8	7
	S.	—	—
	S.E.	3	2
	E.	—	—
	N.E.	1	1

No. 3.—Table showing the Native Population of Malta for 1851, and the Mortality among the Native Population of the Town Districts for the Years 1859, 1860, and 1861.

Towns	Valetta.*			Floriana.			Senglea.			Cospicua.			Vittoriosa.			Total.		
Population, 1851	Males - 11,983 Females - 11,644 Total - 23,627			Males - 3,285 Females - 3,219 Total - 6,504			Males - 2,760 Females - 3,192 Total - 5,952			Males - 5,039 Females - 5,537 Total - 10,576			Males - 2,622 Females - 2,888 Total - 5,510			Males - 25,689 Females - 26,480 Total - 52,169		
Fatal Diseases.	M.	F.	Total.	M.	F.	Total	M.	F.	Total	M.	F.	Total.	M.	F.	Total	M.	F.	Total.
Epidemic Diseases, &c.																		
Nervous fever, Typhus	35	22	57	7	12	19	3	8	11	20	11	31	7	7	14	72	60	132
Small-pox	68	69	137	1	4	5	3	1	4	27	22	49	—	1	1	99	97	196
Whooping-cough	11	11	22	3	5	8	—	—	—	3	2	5	6	4	10	23	22	45
Croup	6	12	18	4	—	4	4	3	7	7	1	8	5	5	10	26	21	47
Measles	20	20	40	—	—	—	—	—	—	4	—	4	2	1	3	26	21	47
Scarlatina	—	1	1	—	—	—	18	17	35	2	2	4	—	—	—	20	20	40
Sporadic Diseases.																		
Nervous System :—																		
Cephalitis	19	13	32	3	—	3	—	1	1	3	6	9	11	7	18	36	27	63
Apoplexy	35	42	77	5	10	15	10	12	22	8	24	32	5	8	13	63	96	159
Myelitis	1	—	1	—	1	1	2	—	2	1	1	2	1	—	1	5	2	7
Paralysis	1	—	1	—	—	—	—	—	—	—	1	1	—	3	3	1	4	5
Convulsions	57	49	106	9	7	16	2	8	10	4	5	9	7	5	12	79	74	153
Tetanus	3	2	5	1	—	1	—	—	—	—	1	1	1	—	1	5	3	8
Hydrocephalus	4	4	8	—	—	—	4	3	7	—	—	—	—	—	—	8	7	15
Delirium tremens	3	—	3	—	—	—	—	—	—	—	—	—	—	—	—	3	—	3
Respiratory Organs :—																		
Laryngitis	5	3	8	—	4	4	2	1	3	—	—	—	3	3	6	10	11	21
Quinsey	2	1	3	—	—	—	1	1	2	1	—	1	—	—	—	4	2	6
Bronchitis	25	27	52	2	3	5	3	2	5	17	15	32	5	9	14	52	56	108
Pneumonia	31	30	61	4	5	9	14	16	30	9	17	26	11	4	15	69	72	141
Pleuritis	—	1	1	—	—	—	—	1	1	1	—	1	—	—	—	1	2	3
Asthma	3	3	6	2	—	2	—	—	—	2	—	2	—	—	—	7	3	10
Hydrothorax	5	3	8	3	2	5	1	3	4	3	1	4	1	1	2	13	10	23
Circulation :—																		
Cardiopathia	28	18	46	3	3	6	1	8	9	2	5	7	3	5	8	37	39	76
Palpitation	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Pericarditis, Hydro-P.	12	4	16	3	1	4	2	2	4	4	3	7	1	2	3	22	12	34
Digestive Organs :—																		
Teething	132	149	281	39	47	86	32	31	63	151	97	248	37	26	63	391	350	741
Cancrum oris	1	—	1	—	1	1	—	—	—	1	—	1	1	1	2	3	2	5
Gastritis, Enteritis	40	46	86	12	13	25	11	17	28	62	40	102	27	25	52	152	141	293
Peritonitis	—	9	9	—	—	—	—	1	1	—	1	1	—	—	—	—	11	11
Ascitis	—	3	3	—	—	—	1	3	4	2	2	4	2	1	3	5	9	14
Hernia	2	3	5	—	—	—	—	—	—	1	—	1	—	—	—	3	3	6
Ileus	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hæmorrhoids	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Liver and Spleen :—																		
Hepatopathia	21	16	37	—	—	—	6	4	10	11	6	17	3	3	6	41	29	70
Splenopathia	1	2	3	—	—	—	—	—	—	2	1	3	2	3	5	5	6	11
Urinary Organs :—																		
Nephritis	1	1	2	—	—	—	1	1	2	—	—	—	1	1	2	3	3	6
Cystitis	3	—	3	1	—	1	1	—	1	3	1	4	—	—	—	8	1	9
Stone	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Stricture, Ischuria	2	—	2	—	—	—	—	—	—	—	—	—	—	—	—	2	—	2
Diabetes	1	—	1	—	—	—	—	—	—	—	—	—	1	—	1	2	—	2
Generative Organs :—																		
Childbed	—	4	4	—	—	—	—	2	2	—	7	7	—	2	2	—	15	15
Metritis	—	2	2	—	1	1	—	1	1	—	5	5	—	—	—	—	9	9
Ovarian Dropsy	—	—	—	—	—	—	—	1	1	—	—	—	—	—	—	—	1	1
Integumentary and Cellular :—																		
Phlegmon, Abscess	—	—	—	—	—	—	—	1	1	—	1	1	—	1	1	—	3	3
Tumor	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mortification	2	1	3	1	—	1	1	—	1	1	1	2	—	1	1	5	3	8
Anthrax	5	—	5	—	—	—	1	2	3	3	—	3	1	2	3	10	4	14
Erysipelas	4	1	5	1	3	4	—	—	—	2	—	2	4	1	5	11	5	16
Constitutional :—																		
Scrofula	6	7	13	—	—	—	—	—	—	—	—	—	—	—	—	6	7	13
Phthisis	37	43	80	5	7	12	3	14	17	8	22	30	9	8	17	62	94	156
Atrophy mesenterica	24	28	52	28	17	45	9	13	22	10	7	17	19	15	34	90	80	170
Cancer	3	15	18	1	—	1	—	1	1	4	6	10	1	2	3	9	24	33
Hæmorrhages :—																		
Hæmoptysis	6	1	7	—	—	—	—	—	—	—	—	—	3	—	3	9	1	10
Hæmatemesis	4	1	5	—	—	—	—	—	—	—	—	—	—	—	—	4	1	5
Metrorrhagia	—	4	4	—	1	1	—	1	1	—	1	1	—	1	1	—	8	8
Purpura hæmorrhagica	—	—	—	—	—	—	—	—	—	1	—	1	—	1	1	1	1	2
Uncertain Seat :—																		
Debility	24	16	40	9	3	12	16	9	25	30	24	54	7	9	16	86	61	147
Fever	3	1	4	1	—	1	—	—	—	1	—	1	—	—	—	5	1	6
Dropsy	6	12	18	1	2	3	1	1	2	2	1	3	3	5	8	13	21	34
Lightning	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Accidents or Violence :—																		
Asphyxia	6	11	17	2	—	2	4	5	9	—	1	1	—	—	—	12	17	29
Drowning	2	—	2	—	—	—	—	—	—	1	—	1	—	—	—	3	—	3
Concussio	3	1	4	—	—	—	—	1	1	1	1	2	—	—	—	4	3	7
Vulnus	1	—	1	—	—	—	—	—	—	—	—	—	1	—	1	2	—	2
Ambustio	2	1	3	—	—	—	1	—	1	1	1	2	1	—	1	5	2	7
Old age, marasmus senilis	7	9	16	3	1	4	3	5	8	—	7	7	2	1	3	15	23	38
Unknown	—	—	—	1	1	2	—	—	—	—	—	—	1	—	1	2	1	3

* 1859 Return for Valetta is for 10 months only.

No. 4.

TABLE showing the CAUSES of MORTALITY among the POPULATION of 21 Country Districts containing 23,213 MALES, and 22,639 FEMALES in MALTA, and the TOTAL DEATHS for a Period of Three Years 1858, 1859, and 1860.

Diseases.	Males.	Females.	Diseases.	Males.	Females.
ENDEMIC DISEASES, &c.			*Urinary Organs* :—		
			Nephritis - - - - -	1	—
Nervous fever, Typhus - -	41	50	Cystitis - - - - -	4	—
Small-pox - - - -	67	63	Stone - - - - -	—	—
Whooping-cough - - -	35	34	Stricture, Ischuria - - -	2	2
Croup - - - -	20	15	Diabetes - - - - -	3	1
Measles - - - -	26	35	*Organs of Generation* :—		
Chicken-pox - - - -	1	—	Childbed - - - - -	—	15
Scarlatina - - - -	1	2	Metritis - - - - -	—	7
			Integumentary and Cellular Systems :—		
			Phlegmon, Abscess - - -	7	7
SPORADIC DISEASES.			Tumor - - - - -	—	1
			Mortification - - -	12	9
Nervous System :—			Anthrax - - - - -	3	1
Cephalitis - - - -	20	19	Erysipelas - - - - -	8	4
Apoplexy - - - -	108	90	*Constitutional* :—		
Paralysis - - - -	1	1	Scrofula - - - - -	11	7
Convulsions - - -	201	126	Phthisis - - - - -	31	40
Tetanus (Trismus) - - -	26	10	Atrophia mesenterica - -	141	156
Hydrocephalus - - -	6	2	Cancer - - - - -	9	9
Respiratory Organs :—			*Hæmorrhage* :—		
Laryngitis - - - -	8	1	Hæmoptysis - - - -	1	4
Quinsey - - - -	24	11	Hæmatemesis - - - -	1	—
Bronchitis - - - -	77	73	Metrorrhagia - - - -	—	8
Pneumonia - - - -	89	76	Purpura hæmorrhagica - -	2	—
Pleuritis - - - -	6	6	*Uncertain Seat* :—		
Asthma - - - -	8	22	Debility - - - - -	114	84
Hydrothorax - - -	22	37	Fever - - - - -	2	3
Organs of Circulation :—			Petechial fever - - -	3	1
Cardiopathia - - -	10	17	Dropsy - - - - -	25	32
Palpittio - - - -	—	1	Scurvy - - - - -	—	1
Pericarditis, Hydrop. Pericard. -	14	3	*Accidental* :—		
Digestive Organs :—			Asphyxia - - - - -	24	15
Teething - - - -	410	410	Strangulation - - -	—	1
Cancrum oris - - -	—	2	Hanging - - - - -	1	1
Gastritis, Enteritis - - -	190	216	Suffocation - - - - -	2	1
Peritonitis - - - -	5	6	Drowning - - - - -	3	3
Ascites - - - -	7	16	Concussion - - - - -	5	3
Hernia - - - -	4	3	Ambustio - - - - -	1	2
Liver and Spleen :—			Vulnus - - - - -	7	3
Hepatopathia - - -	45	36	Old age and marasmus senilis -	26	43
Splenopathia - - -	25	31	Unknown - - - - -	—	1

No. 5.

POPULATION of MALTA and GOZO, according to the CENSUS taken on the 31st March 1851.

——	Males.	Females.	Total.
Population of Malta - - -	53,478	55,355	108,833
Do. Gozo - - -	6,978	7,685	14,663
Total - - -	60,456	63,040	123,496
Population of Valetta - - -	12,670	12,131	24,801
Do. Floriana - - -	3,388	3,317	6,705
Do. Vittoriosa - - -	2,697	2,978	5,675
Do. Cospicua - - -	5,113	5,592	10,705
Do. Senglea - - -	2,884	3,276	6,160

N.B.—The Census of 1861 is in progress of abstraction.

No. 6.—General Table showing the Admissions and Deaths in the Central Civil Hospital, Floriana, during the Years 1859, 1860, and 1861.

Disease.	Remaining on the 31st December 1858.									Admissions.									Deaths.									Total.			
	Natives.		British.		Foreigners.		Total.			Natives.		British.		Foreigners.		Total.			Natives.		British.		Foreigners.		Total.			Under Treatment during the 3 Years.	Discharged.	Died.	Remaining on the 31st Dec. 1861.
	M.	F.	M.	F.	M.	F.	M.	F.	Total.	M.	F.	M.	F.	M.	F.	M.	F.	Total.	M.	F.	M.	F.	M.	F.	M.	F.	Total.				
Zymotic Diseases:—																															
Variola	–	–	–	–	–	–	–	–	–	11	6	2	–	–	–	13	6	19	1	–	–	–	–	–	1	–	1	19	13	1	5
Morbilli	–	–	–	–	–	–	–	–	–	1	–	–	–	2	–	3	–	3	1	–	–	–	–	–	1	–	1	3	2	1	–
Ophthalmia	1	–	–	–	–	–	1	–	1	114	69	2	–	5	–	121	69	190	–	–	–	–	–	–	–	–	–	191	188	–	3
Erysipelas	–	–	–	–	–	–	–	–	–	1	5	–	1	1	–	2	6	8	–	–	–	–	1	–	1	–	1	8	7	1	–
Dysenteria	–	–	–	–	–	–	–	–	–	20	18	13	–	14	–	47	18	65	9	10	2	–	2	–	13	10	23	65	42	23	–
Diarrhœa	–	3	–	–	–	–	–	3	3	73	84	24	1	17	–	114	85	199	19	40	1	–	1	–	21	40	61	202	139	61	2
Febris intermittens	–	–	–	–	–	–	–	–	–	24	1	20	–	38	–	82	1	83	2	–	–	–	–	–	2	–	2	83	78	2	3
Febris typhoides	–	–	–	–	–	–	–	–	–	5	3	–	1	3	–	8	4	12	3	–	–	–	1	–	4	–	4	12	6	4	2
Febris continua	–	–	–	–	–	–	–	–	–	113	51	27	2	77	–	217	53	270	11	11	3	–	5	–	19	11	30	270	236	30	4
Rheumatismus	4	1	–	–	–	–	4	1	5	225	64	42	–	27	2	294	66	360	13	8	2	–	1	1	16	9	25	365	335	25	5
Syphilis primaria	2	1	–	–	1	–	3	1	4	76	96	38	2	38	–	152	98	250	1	–	–	–	–	–	1	–	1	254	247	1	6
Syphilis secundaria	1	1	–	–	–	–	1	1	2	43	31	19	4	8	2	70	37	107	1	2	–	–	–	–	1	2	3	109	103	3	3
Gonorrhœa	–	1	–	–	–	–	–	1	1	46	24	23	4	18	–	87	28	115	–	–	–	–	–	–	–	–	–	116	109	–	7
Strictura urethræ	–	–	–	–	–	–	–	–	–	41	–	1	–	1	–	43	–	43	2	–	–	–	1	–	3	–	3	43	40	3	–
Purpura	–	–	–	–	–	–	–	–	–	3	1	–	–	–	–	3	1	4	–	–	–	–	–	–	–	–	–	4	4	–	–
Ebriositas	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	1	–	1	–	–	–	–	–	–	–	–	–	1	1	–	–
Tenia solium	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	1	–	1	–	–	–	–	–	–	–	–	–	1	1	–	–
Ascaris lumbricoides	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Constitutional Diseases:—																															
Dropsy	–	3	–	–	–	–	–	3	3	58	63	7	–	5	–	70	63	133	29	41	1	–	2	–	32	41	73	136	61	73	2
Cancer	–	–	–	–	–	–	–	–	–	15	7	1	–	–	–	16	7	23	3	4	–	–	–	–	3	4	7	23	15	7	1
Diabetes	–	–	–	–	–	–	–	–	–	5	–	–	–	–	–	5	–	5	1	–	–	–	–	–	1	–	1	5	3	1	1
Scrofula	2	1	–	–	–	–	2	1	3	29	13	–	–	3	–	32	13	45	2	3	–	–	–	–	2	3	5	48	42	5	1
Phthisis pulmonalis	–	–	–	–	–	–	–	–	–	39	42	1	1	2	–	42	43	85	19	23	–	1	1	–	20	24	44	85	37	44	4
Hæmoptysis	–	–	–	–	–	–	–	–	–	7	1	–	–	–	–	7	1	8	3	–	–	–	–	–	3	–	3	8	5	3	–
Local Diseases:—																															
Meningitis	–	–	–	–	–	–	–	–	–	1	3	–	–	–	–	1	3	4	1	2	–	–	–	–	1	2	3	4	1	3	–
Apoplexia	–	–	–	–	–	–	–	–	–	32	27	2	–	3	–	37	27	64	12	17	–	–	–	–	12	17	29	64	34	29	1
Paralysis	–	–	–	–	–	–	–	–	–	31	11	2	–	1	–	34	11	45	2	4	–	–	–	–	2	4	6	45	38	6	1
Delirium tremens	–	–	–	–	–	–	–	–	–	–	–	1	1	–	–	1	1	2	–	–	–	–	–	–	–	–	–	2	2	–	–
Convulsio	–	–	–	–	–	–	–	–	–	2	2	–	–	–	–	2	2	4	–	–	–	–	–	–	–	–	–	4	4	–	–
Neuralgia	–	–	–	–	–	–	–	–	–	3	3	1	–	–	–	4	3	7	–	–	–	–	–	–	–	–	–	7	6	–	1
Otitis	–	–	–	–	–	–	–	–	–	4	–	–	–	–	–	4	–	4	–	–	–	–	–	–	–	–	–	4	4	–	–
Fistula lachrymalis	–	–	–	–	–	–	–	–	–	2	–	–	–	1	–	3	–	3	–	–	–	–	–	–	–	–	–	3	3	–	–
Cataracta	–	–	–	–	–	–	–	–	–	2	5	–	–	–	–	2	5	7	–	–	–	–	–	–	–	–	–	7	5	–	2
Amaurosis	–	–	–	–	–	–	–	–	–	5	2	–	–	–	–	5	2	7	–	–	–	–	–	–	–	–	–	7	7	–	–
Pericarditis	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	1	–	1	–	–	–	–	–	–	–	–	–	1	1	–	–
Aneurisma	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	1	–	1	–	–	–	–	–	–	–	–	–	1	1	–	–
Varix	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	1	–	1	–	–	–	–	–	–	–	–	–	1	1	–	–
Cardiopathia	1	–	–	–	–	–	1	–	1	15	15	3	1	1	1	19	17	36	4	2	–	–	–	–	4	2	6	37	30	6	1
Laryngitis	–	–	–	–	–	–	–	–	–	16	4	3	–	3	–	22	4	26	–	1	–	–	–	–	–	1	1	26	25	1	–
Bronchitis	3	2	–	–	–	–	3	2	5	159	90	20	3	18	–	197	93	290	32	21	3	1	2	–	37	22	59	295	225	59	11
Pleuritis	–	–	–	–	–	–	–	–	–	7	5	1	1	1	–	9	6	15	2	1	–	–	–	–	2	1	3	15	12	3	–
Pneumonia	1	–	–	–	–	–	1	–	1	33	14	4	–	7	–	44	14	58	11	4	1	–	3	–	15	4	19	59	39	19	1
Asthma	–	1	–	–	–	–	–	1	1	7	–	–	–	1	–	8	–	8	1	–	–	–	1	–	2	–	2	9	7	2	–
Asphyxia	–	–	–	–	–	–	–	–	–	2	–	–	–	1	–	3	–	3	–	–	–	–	–	–	–	–	–	3	3	–	–
Gastritis	1	–	–	–	–	–	1	–	1	41	35	12	–	15	–	68	35	103	9	2	–	–	1	–	10	2	12	104	91	12	1
Enteritis	–	–	–	–	–	–	–	–	–	8	12	–	–	–	–	8	12	20	2	4	–	–	–	–	2	4	6	20	14	6	–
Peritonitis	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Gastricismus	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	1	–	1	–	–	–	–	–	–	–	–	–	1	1	–	–
Hernia	–	–	–	–	–	–	–	–	–	11	3	–	–	3	–	14	3	17	3	1	–	–	2	–	5	1	6	17	11	6	–
Hæmorrhois	–	–	–	–	–	–	–	–	–	10	–	–	–	2	–	12	–	12	–	–	–	–	–	–	–	–	–	12	11	–	1
Fistula in ano	1	–	–	–	–	–	1	–	1	–	1	–	–	–	–	–	1	1	–	–	–	–	–	–	–	–	–	2	2	–	–
Hepatitis	2	–	–	–	–	–	2	–	2	45	18	6	1	11	–	62	19	81	16	6	1	1	–	–	17	7	24	83	55	24	4
Splenitis	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	1	1	–	–	–	–	–	–	–	–	–	1	1	–	–
Costipatio	–	–	–	–	–	–	–	–	–	4	–	–	–	2	–	6	–	6	1	–	–	–	–	–	1	–	1	6	5	1	–
Prolapsus recti	–	–	–	–	–	–	–	–	–	–	2	–	–	–	–	–	2	2	–	–	–	–	–	–	–	–	–	2	2	–	–
Nephritis	–	–	–	–	–	–	–	–	–	2	3	–	–	–	–	2	3	5	–	1	–	–	–	–	–	1	1	5	3	1	1
Cystitis	–	–	–	–	–	–	–	–	–	3	1	–	–	–	–	3	1	4	1	–	–	–	–	–	1	–	1	4	2	1	1
Calculus	–	–	–	–	–	–	–	–	–	4	1	–	–	–	–	4	1	5	2	–	–	–	–	–	2	–	2	5	3	2	–
Hydrocele	–	–	–	–	–	–	–	–	–	5	–	–	–	–	–	5	–	5	–	–	–	–	–	–	–	–	–	5	5	–	–
Orchitis	–	–	–	–	–	–	–	–	–	16	–	3	–	5	–	24	–	24	–	–	–	–	–	–	–	–	–	24	24	–	–
Metritis	–	1	–	–	–	–	–	1	1	–	28	–	–	–	–	–	28	28	–	6	–	–	–	–	–	6	6	29	21	6	2
Prolapsus uteri	–	–	–	–	–	–	–	–	–	–	2	–	–	–	–	–	2	2	–	–	–	–	–	–	–	–	–	2	2	–	–
Metrorrhagia	–	–	–	–	–	–	–	–	–	–	2	–	–	–	–	–	2	2	–	–	–	–	–	–	–	–	–	2	2	–	–
Arthritis	–	–	–	–	–	–	–	–	–	1	1	–	1	–	–	1	2	3	–	1	–	–	–	–	–	1	1	3	2	1	–
Psora	–	–	–	–	–	–	–	–	–	24	52	2	–	2	–	28	52	80	–	–	–	–	–	–	–	–	–	80	80	–	–
Herpes	–	–	–	–	–	–	–	–	–	9	17	2	–	2	–	13	17	30	–	1	–	–	–	–	–	1	1	30	28	1	1
Tinea	1	–	–	–	–	–	1	–	1	20	6	–	–	1	–	21	6	27	–	–	–	–	–	–	–	–	–	28	28	–	–
Phlegmon	2	–	2	–	–	–	4	–	4	102	12	15	1	13	–	130	13	143	6	1	1	–	3	–	10	1	11	147	133	11	3
Abscessus	–	–	–	–	–	–	–	–	–	11	4	–	–	3	–	14	4	18	2	1	–	–	–	–	2	1	3	18	12	3	3
Tumor	1	–	–	–	–	–	1	–	1	30	6	–	–	5	–	35	6	41	–	2	–	–	–	–	–	2	2	42	39	2	1
Carbunculus	–	–	–	–	–	–	–	–	–	9	4	–	–	–	–	9	4	13	–	–	–	–	–	–	–	–	–	13	11	–	2
Ulcus	–	4	–	–	–	–	–	4	4	130	100	26	3	25	–	181	103	284	21	5	–	–	–	–	21	5	26	288	249	26	13
Elephantiasis	–	–	–	–	–	–	–	–	–	–	4	–	–	–	–	–	4	4	–	2	–	–	–	–	–	2	2	4	2	2	–
Gangræna	–	–	–	–	–	–	–	–	–	5	3	–	–	1	–	6	3	9	2	2	–	–	1	–	3	2	5	9	–	5	4
Polypus nasi	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	1	1	–	–	–	–	–	–	–	–	–	1	1	–	–
Hæmatemesis	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	1	–	1	–	–	–	–	–	–	–	–	–	1	1	–	–
Developmental Diseases:—																															
Chlorosis	–	–	–	–	–	–	–	–	–	–	3	–	–	–	–	–	3	3	–	–	–	–	–	–	–	–	–	3	2	–	1
Paramenia	–	–	–	–	–	–	–	–	–	–	3	–	–	–	–	–	3	3	–	–	–	–	–	–	–	–	–	3	2	–	1
Debilitas infantilis	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Anemia	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	1	–	1	–	–	–	–	–	–	–	–	–	1	1	–	–
Senectus	–	–	–	–	–	–	–	–	–	2	17	–	–	–	–	2	17	19	–	6	–	–	–	–	–	6	6	19	13	6	–
Imperforatio ani	–	1	–	–	–	–	–	1	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	1	–	–
Violence and Accidents:—																															
Ambustio	–	–	–	–	–	–	–	–	–	3	3	3	–	2	–	8	3	11	–	–	–	–	–	–	–	–	–	11	10	–	1
Contusio	–	–	–	–	–	–	–	–	–	108	16	18	–	21	–	147	16	163	2	–	–	–	–	–	2	–	2	163	161	2	–
Fractura	–	1	–	–	–	–	–	1	1	65	23	10	–	11	–	86	23	109	6	2	1	–	–	–	7	2	9	110	94	9	7
Vulnus	–	–	–	–	–	–	–	–	–	104	6	21	–	14	–	139	6	145	5	1	1	–	–	–	6	1	7	145	136	7	2
Vulnus sclopetarium	–	–	–	–	–	–	–	–	–	10	–	1	–	–	–	10	1	11	1	–	–	–	–	–	1	–	1	11	9	1	1
Luxatura	–	–	–	–	–	–	–	–	–	4	3	1	–	–	–	5	3	8	1	–	–	–	–	–	1	–	1	8	7	1	–
Concussio	–	–	–	–	–	–	–	–	–	12	–	–	–	1	–	13	–	13	3	–	–	–	–	–	3	–	3	13	9	3	1
Tetanus	–	–	–	–	–	–	–	–	–	5	–	–	–	–	–	5	–	5	4	–	–	–	–	–	4	–	4	5	1	4	–
Pregnans	–	2	–	–	–	–	–	2	2	–	67	–	1	–	–	–	68	68	–	2	–	–	–	–	–	2	2	70	64	2	4
Puerperium	–	–	–	–	–	–	–	–	–	–	5	–	–	–	–	–	5	5	–	–	–	–	–	–	–	–	–	5	5	–	–
Under observation	–	–	–	–	–	–	–	–	–	20	39	22	5	8	–	50	44	94	–	–	–	–	–	–	–	–	–	94	94	–	–
Parents with their children	–	1	–	–	–	–	–	1	1	1	18	–	–	–	–	1	18	19	–	–	–	–	–	–	–	–	–	20	18	–	2
Children with their parents	–	2	–	–	–	–	–	2	2	–	79	–	–	–	–	–	79	79	–	–	–	–	–	–	–	–	–	81	81	–	–
Total							26	26	52							2963	1389	4352							317	244	561	4,404	3720	561	123

Dr. L. Pisani, Superintendent. D. G. Desalvo, Physician. Dr. G. L. Engerer, Surgeon.

No. 7.

Office of Land Revenue and Public Works,
Sir, Valetta, 17th July 1861.

I have the honour to transmit for the information of His Excellency the Governor, the following returns :—

Return of works in progress for the month of June last.

Return of the public tanks in Valetta, Floriana, and the three cities.

Return of public fountains.

Return of the tanks in barracks and other public establishments.

Return of the public tanks in the country.

Prior to the preparation of the four last-mentioned returns, I thought it proper to direct the two senior guardians of the aqueducts, upon whose operations, owing to their long experience in the service, the Government might rely with confidence, to make a general survey of the two aqueducts, to measure the quantity of water flowing from the different sources, to state the manner in which that water is distributed, and to verify the capacity and contents of all the public tanks, and at the same time to give an approximate estimate of the capacity of the tanks in private houses within the cities.

By their report, which I have also the honour to transmit, it will be seen that the sources of the Wignancourt aqueduct are 10 in number, giving together at this moment 373½ gallons of water per minute, which, in winter time, increases in relation to the quantity of rain.

The flow of water from that quantity to the public fountains and other reservoirs in the country, is at the present time 99½ gallons per minute, equal to 568½ tons per 24 hours.

The water constantly flowing into the public fountains at Floriana, the officers' quarters, barracks, Capuchin convent, public gardens, civil hospital, Ospigio, as detailed in the said report, is now 27¼ per minute, equal to 155¾ tons for 24 hours.

The water constantly running into the public fountains of Valetta, into the nunneries, to Messrs. Woodhouse's stores, to the military hospitals, and to St. Elmo barracks, is 34 gallons per minute, equal to 194¼ tons for 24 hours.

By the said report it will also be seen that there are 35 direct communications with the aqueduct, using water *ad libitum*, the consumption of which, by an estimate made, amounts to 89 gallons per minute.

The remaining quantities, out of the total of the spring aqueduct, 124 gallons per minute, is distributed into the public tanks, and in tanks of private houses and gardens, and from which water is also supplied to men of war, steamers, and other shipping.

The aqueduct which conveys water into the towns of Cospicua, Vittoriosa and Senglea, called the "Fauara Aqueduct," derives its water from the following springs, which, having been measured, have been found to give—

	Gallons per minute.
The spring at St. Giorgio -	31½
„ „ Annunziata -	16
	47½
To which is to be added the spring lately acquired, "Tal Fauara," (the deed of the transfer of which has been signed to-day)	16½
Total -	64

The quantity of water required to keep in an efficient state the public fountains in these cities, amounting to 27 gallons per minute, equal to 154¼ tons per 24 hours, there would remain a balance (when the new spring is added) of 37 gallons per minute, or 211 tons for 24 hours, which would enable this department to fill up the several public cisterns and the new naval tank at Corradino, within the space of four months.

The number of public tanks in Valetta, Floriana, Cospicua, Senglea and Vittoriosa, is 122 ; their total capacity is—

	Tons.
	118,721
The number of tanks in the public institutions, barracks, and other military and public buildings, is 152 ; capable of containing - - -	102,666

The number of tanks in private houses in the four cities and Floriana is 4,294, which, at the minimum rate of 300 tons each, might be capable of holding 1,288,200, but may be considered at present to contain only one third of that quantity.

The number of public tanks in the country is 123 ; their capacity, having been carefully measured, amounts to 28,926 tons :—the water they hold is 18,008, not including the small quantity existing in the tanks recently constructed at Sliema, and St. Julian's, the capacity of which is 7,428 tons ; these will be emptied ere long, to prepare them against next autumn for the reception of water.

In concluding, I venture to submit for the consideration of His Excellency the Governor, the expediency of adopting the following measures, necessary, in my opinion, for filling up with the least possible delay, the public tanks, and the tanks in the civil and military establishments.

1st. That all permanent pittances of water, with the exception of those to public fountains and reservoirs, be stopped.

2nd. That all direct communications with the aqueduct by which water is taken *ad libitum*, be removed.

3rd. That all civil and military establishments should draw water from their cisterns by pumps, conveying the same to iron or wooden tanks, to be placed on an elevated position of the building, from which it might be distributed by pipes to any locality, in the same manner as has been lately done in the New Lunatic Asylum.

4th. That the works included in the estimates which I have the honour to forward herewith may be executed without loss of time.

I have, &c.
(Signed) G. Vella,
Collector.

Return of Cisterns in Public Departments in Valetta, Floriana, and the Three Cities showing their Capacity and the Water existing in them on the 30th June 1861.

Where situated.	Capacity.		Contents.	
Valetta.	Feet.	Tons.	Feet.	Tons.
Fort St. Elmo (Upper) -	31 0	1,628·88	31 0	1,628·88
Do. do. -	23 0	757·63	4 0	126
Do. do. -	26 0	887·188	4 0	126
Do. do. -	16 0	147	1 6	15
Do. (Lower) -	28 6	8,322·8	17 6	4,900
Do. do. -	16 6	180	2 6	100
General Hospital -	35 6	1,277·24	27 8	1,032
Do. - -	35 6	1,160	2 4	100
Do. - -	14 0	68·160	2 0	9
Do. - -	14 0	68·168	2 6	10
Do. - -	25 0	73·36	6 8	20
Strada Torre barracks -	27 6	800	12 5	390
St. James' Cavalier barracks -- - -	35 6	878	9 4	220
Commissariat Bakery -	30 0	915·20	20 0	550
Do. - -	16 0	622·60	16 0	622·60
Do. - -	26 0	557·70	3 2	62
Do. - -	16 0	105·28	4 0	26
Do. - -	10 0	32*		

* Blocked up for the convenience of the Commissariat Department.

Where situated.	Capacity.		Contents.	
	Feet.	Tons.	Feet.	Tons.
Auberge de Castile	30 0	1,088	21 9	730
Do.	17 0	500	14 0	430
Do.	17 0	300	9 0	140
Auberge di Bavaria	30 0	1,090	13 0	530
Do. d'Italia	32 0	1,628	12 0	790
Do. de France	29 0	1,088·109	7 0	280
Do. do.	20 0	130	6 0	30
Do. do.	26 0	130	5 0	30
Do. do.	18 0	100	10 0	55
Do. do.	14 0	203	8 6	110
Do. de Provence	19 0	300	1 0	15
Do. do.	18 0	1,000	2 8	170
The Court	18 0	87	18 0	87
Do.	16 0	89	2 4	12
Do.	26 0	800	16 0	480
Do.	14 0	132	1 0	10
Orphan Asylum	11 0	200	8 0	165
Hospital of Incurables	27 0	926	5 6	210
Do.	7 0	36·160	—	Empty.*
Do.	18 0	200	5 0	60
Military Store Department	24 0	198	18 6	150
Do.	32 0	500	15 6	250
Workshop at St. Mezzodi	15 6	120	15 6	120
Do.	15 0	85	15 0	85
Do.	13 0	190	2 6	65
Communication to Ditch St. John's	26 0	587·190	24 0	520
Communication to St. Michael	11 0	45	6 9	30
Lower Flank St. Andrew	12 0	68	1 5	12
Do.	11 0	18	3 3	6
Do.	14 0	72	14 0	72
Old Prison	34 0	397·15	9 4	100
Do.	24 0	203·44	2 9	30
Public Library	22 6	631·125	7 5	170
Do.	8 6	97	2 4	30
The Palace	38 0	900	21 8	470
Do.	24 0	640	7 4	220
Do.	26 0	540	11 0	240
Do.	18 0	893	1 6	90
Porta Reale Ditch	20 0	191·101	4 0	50
Do.	17 0	132·54	4 0	35
Do.	13 0	162·113	2 10	40
Do.	12 0	73·32	—	Empty.*
Strada San Marco Barracks	19 0	194	19 0	194
Carpenter's Shop, Strada Fianca	18 0	147	6 6	55
Lascaris Barracks	26 0	1,842	5 6	370
Do.	25 0	1,011	3 9	130
FLORIANA.				
Poor House	28 6	282·30	18 6	180
Do.	24 6	719·64	24 6	719·64
Do.	17 6	683·112	17 6	683·112
Do.	10 6	176·82	9 6	160
Do.	17 6	71·28	10 0	40
Do.	17 6	188·20	7 4	100
Do.	14 0	68	14 0	68
Do.	20 0	73	14 0	50
Do.	19 0	73	—	Empty.*
Do.	14 0	56	5 9	18
Piazza Militare Barracks	22 0	878	12 6	440
Mad House	15 0	600	15 0	600
Do.	22 0	680	3 0	90
Do.	13 0	24	10 0	20
Do.	13 0	60	11 0	50
Do.	20 0	400	2 0	40
Do.	13 0	68	1 0	5
Do.	14 0	73	3 0	30
Do.	18 0	450	—	Empty.*
Argotti Gardens	18 0	1,600	12 6	1,000
Do.	11 0	785	5 0	392
Do.	15 0	73	3 0	15
Do.	15 0	68	10 0	50
St. Francis Barracks	26 0	205	1 6	10
Do. Ravelin	6 0	14	6 0	14
Notre Dame Gate	4 0	28	3 0	20
Do.	18 0	153	18 0	153
Notre Dame Ditch	16 0	73	8 0	37
Do.	17 0	68	3 7	12
Corradino	28 6	7,568	26 0	7,400

* Out of repair.

Where situated.	Capacity.		Contents.	
	Feet.	Tons.	Feet.	Tons.
SENGLEA.				
Isola Point Battery	34 0	800	6 0	133
Isola, Field Officers' Quarters	16 0	500	10 0	340
Isola, Officers' Quarters	18 0	140	5 0	50
Do.	24 0	640	2 0	54
COSPICUA.				
St. Elena, No. 1.	28 6	7,870	25 5	6,970
Do. No. 2	28 6	312	25 5	9,900
St. Francis Barracks	18 0	11,190	2 9	35
Do. Ditch	16 0	40	2 3	2
Do. do.	14 0	72	—	Empty.†
VITTORIOSA.				
Inquisitor's Palace	26 0	430	9 8	190
Do.	14 0	100	2 4	12
Do.	14 0	72	9 2	50
Do.	14 0	68	—	Empty.†
Cotonera Hospital	30 0	500	13 6	200
Do.	14 0	68	7 0	28
Do.	15 0	120	15 0	120
Cotonera, St. Salvador Fort	22 0	800	1 9	60
Cotonera, St. Salvador Ditch	20 0	484	—	Empty.†
Do.	19 0	270	4 6	54
Do.	17 0	595	11 9	430
Do.	10 0	15	10 0	14
Do.	22 0	854	5 11	220
Do.	20 0	855	1 9	70
Do. Zabbar Gate	19 0	68	2 1	10
Do.	18 0	173*	—	—
Do.	14 0	76	9 5	50
Do.	14 0	556	0 8	20
Do.	19 0	470	18 0	460
Do.	16 0	200	12 6	150
Do.	24 0	3,000	9 9	1,130
Do.	14 0	73	3 9	25
Do.	26 0	1,600	19 6	1,200
Fort St. Angelo	30 0	800	6 8	180
Do.	22 0	630	1 2	25
Do.	22 0	500	4 7	100
Do.	10 0	73	0 8	5
Do.	22 0	147	—	Empty.†
Do.	22 0	700	2 0	63
Do.	11 0	83	—	Empty.†
Do.	16 0	68	2 6	8
Fort Ricasoli	26 0	1,156	10 0	550
Do.	17 0	450	0 10	20
Do.	13 0	68	0 9	5
Do.	14 0	73	5 3	26
Do.	28 0	800	0 3	Empty.†
Do.	28 0	700	3 10	90
Do.	28 0	800	1 0	25
Do.	32 0	500	0 8	8
Do.	20 0	365	0 8	8
Do.	18 0	365	—	Empty.†
Fort Verdala	30 0	3,333	10 8	1,111
Do.	30 0	833	—	Empty.†
Do.	9 0	25	5 4	15
Do.	18 0	600	—	Empty.†
Do.	24 0	666	2 0	50
Do.	20 0	800	9 10	800
Do.	5 0	14	—	Empty.†
Do.	14 0	147	1 10	10
	—	102,746·176	—	55,176·176

* Destroyed by the military.   † Out of repair.

NOTE.—The tanks in this statement within barracks and military departments are to be repaired by the engineer department.

(Signed) G. VELLA, Coll.

RETURN of PUBLIC TANKS in the Country.

Where situated.	Number of Tanks.	Capacity.	Quantity of Water existing.
		Tons.	Tons.
Notabile	5	running water	—
Casal Dingli	1	ditto	—
„ Birchirchara	7	3,491	3,000
„ Lia	4	500	400
„ Balzan	2	1,277	1,060
„ Zeitun	11	4,169	4,070
„ Attard	2	446	400
„ Siggieni	7	1,339	980
„ Zabbar	8	600	540
„ Musta	3	624	530
„ Zebbug	8	1,400	900
„ Nasciaro	13	560	440
„ Micabiba	1	798	798
„ Ditto	1	running water	—
„ Gargur	11	740	650
„ Gudia	4	250	200
„ Chircop	1	2,268	2,000
„ Ditto	2	running water	—
„ Safi	1	240	240
„ Creudi	4	793	480
„ Luca	2	400	200
„ Zurrico	6	233	180
„ Curmi	2	400	240
„ Ditto	1	running water	—
„ Tarxien	3	260	200
„ Asciak	4	390	300
Melleha and St. Paul's Bay	3	320	200
Ditto	1	running water	—
Sliema	2	6,340	—
St. Julian's	3	1,088	—
Total	123	28,926	18,008

(Signed) G. VELLA, Collector.

In adempimento dell' incarrico datoci dal collettore delle Rendite Territoriale di misurare la quantità di acqua che scorre dalle sorgenti dell' Acquedotto Wignancourt e dell Acquedotto Fauara e la loro distribuzione in fontane pubbliche ed in altri locali nelle Quattro Città e nella campagna conferiti nei diversi locali suddetti, passiamo a relatare.

Che le seguenti sono le sorgenti che somministrano l'acqua all' Acquedotto Wingnancourt, e che la quantita che scorre da ciascuna, secondo un' esatta misura da noi presa il 28 Luglio scorso, e come siegue.—

	Gall. per min.
Sorgente di Ghain Kajet	168
„ „ Busugrilla	59½
„ „ Hofret Irriz	36
„ „ Ghariescem	14
„ „ Iccianti	12
„ „ Biepirrua	16½
„ „ Ghain Cliep	9½
„ „ Wied Lemu	9
„ „ Boschetto	47½
„ „ Gnieu Fierez	1½
Totale	373½

Che da questa quantità sono alimentate le seguenti fontane pubbliche e recipienti :—

Nella Campagna :—

	Gall. per. min.
Fontana in Casal Zebbug	3½
Do. do. Attard	1½
Do. do. Lia	2
Do. do. Vallone Birchircara	4
Do. do. Via San Guiseppe	5½
Do. do. do. (Vicino Blacas)	6½
Fontana nella Pietà	1½
Do. do. Misida	2
Do. do. do.	2
Recipienti in Beni del Governo	67
Do. nella Marsa, cioè, nei due Macelli, nell Fornace, nella Conseria	4
Totale	99½

Nella Floriana :—

	Gall. per min.
Fontana nella Piazza St. Anna	5
Do. do. Sarria	3½
Officers' Quarters	1¼
Convento dei Cappucini	4½
Giardino Bottanico	2
Do. D'Argotti	¼
Notre Dame Gate	½
Ospedale Centrale pel lavatojo	1
Floriana Barracks	2¼
Ospigio	7
Totale	27¼

Nella Valetta :—

	Gall. per min.
Fontana vicino Porta Reale	2
Due Fontane sulla Piazza Sn. Giovanni	1½
Fontana nella piccola Piazza Sn. Giovanni	1½
Do. Strada Sta. Ursala	1½
Due Fontane in Piazza S. Giorgio	8
Fontana in Strada Fontana	1½

	Gal. per min.
Fontana in Sta. Cristoforo	1½
Do. nel Manderaggio	2½
Do. do.	3½
Do. do. Porta Marina	2
Recipiente Molo Marina	1½
Do. Porta Calcara	½
Do. Porta Nuova	½
Monastero Sta. Ursala	½
Do. Santa Catarina	½
Casa del Sigr. Woodhouse	2
Ospedale Militare e quartiere St. Elmo (indipendentemente della provista alle cisterne)	3
Totale	34

Che le seguenti communicazioni essendo direttamento coll' Acquedotto il consumo del acqua sta in arbitrio ed a discrezione dei proprietarj ed occupanti dei seguenti fondi :—

Nella Campagna :—

Torre Hofrit Irriz (3 communicazioni.)
Do. Iccianti 5 do.
Giardino Corogna.
Do. Ghain Cliep.
Do. Guien Fierez.
Do. Guien Issultan.
Do. Busugrilla.
Do. Ghariescem.
Torre Bukana.
Molino in Birchircara.
Torre Boschetto (2 communicazioni).

Nella Marsa Floriana & Valetta :—

Fabbrico del gas.
Rivellino Santo Francesco.
Casa del Governo, occupata dal Signor Le Mesurier.
Ospedale Centrale (oltre un gallone per minuto che scorre pel' Lavatojo).
Scuola Militare Piazza Brettanica.
Do. Infantile Piazza Sarria.
Casa Sda. Reale No. 7, di proprietà del Barone Azzopardi.
Farmacia di Governo (Valetta).
Scuola di Governo di femmine.
Casa Sda. Mercanti No. 210, di proprietà di Governo detenuta a censo dal Signor Salvo Gatt.
Bottega Sottoposta, Sda. Mercanti No. 204.
Bottega Strada Teatrô No. 135, detenuta da Antonio Zard.
Caffè de la Reine.
Casa di Governo, occupata dal Signor Cleugh.
Palazzo di Governo.
Orfanatrofio.
Ospedale degli Incurabili.

Da calcolo fatto il consumo delle sopradette communicazioni è di 89 galloni per minuto.

L'Acquedotto della Fauara che somministra acqua alle 3 città e Corradino si alimenta dalle seguenti sorgenti :—

	Gall. per min.
Sorgente in San Giorgio	31½
Do. Annunziata	16
Do. della Fauara	16½
Totale	64

Quest' ultima sorgente non è ancora amressa essenda stata da recente acquistata.

Le prime due sorgenti danno 47½ galloni per minuto, le quali alimentano le seguenti fontane :—

	Gall. per min.
Fontana in Casal Paola	1
Due Fontane nella Vittoriosa	4½
Cinque do. nella Cospicua	9¾
Fontana nella Calcara	2
Due do. Senglia	6¾
Gebietta Pubblicha in C. Luca	3
Totale	27

In adesione delle istruzioni avute abbiamo ancora verificato la capacità e l' acqua esistente nelle seguenti cisterne e gebie, delle quali il seguente é un prospetto :—

Nelle Quattro Città e Floriana No. 122 cisterne pubbliche della capacità di	118,963
152 do nei pubblici stabilimenti e quartieri e fortezze, cioè :—	102,666
No. 63 nella Valetta	
„ 29 „ Floriana	
„ 4 „ Senglia	
„ 5 „ Cospicua	
„ 22 Vittoriosa e Cotonera	
„ 8 nell Forte St. Angelo	
„ 10 „ Ricasoli	
„ 8 „ Verdala	
„ 3 Cotonera Nell' Ospedale	
„ 2 Caserne Lascaris	

La quantità di acqua nelle sopradette 274 cisterne ascende a ton. 130,085.

Da un calcolo approsimativo della capacità delle seguenti cisterne in case private (non avendo potuto misurare con precisione per mancanza di tempo) siamo di opinione che 300 tonnellate ad un coacerro si potrebbe calcolare il minimum della loro capacità, cioè :—

No. 1,281	cisterne nella	Valetta	364,300
288	do.	Floriana	86,400
910	do.	Senglia	273,030
977	do.	Cospicua	293,100
838	do.	Vittoriosa	251,400
Totale			1,489,859

La quantità di acqua nelle sopradette cisterne esistenti in case private potrebbe ad un dipresso considerarsi ad un terzo delle loro capacità ; per fare una misura positiva si richiederebbe il temo di circa 4 mesi.

Le cisterne pubbliche nella campagna ascendono a No. 123, cioè :—

Notabile	5
Dingli	1
Birchircara	7
Lia	4
Balzan	2
Zeitun	11
Attard	2
Siggieni	7
Zabbar	8
Musta	3
Zebbug	8
Naxaro	13
Micabba	2
Gargur	11
Gudia	4
	88
Chircop	3
Safi	1
Crendi	4
Luca	2
Zurrico	6
Curmi	3
Tarxien	3
Asciak	4
Melleha & San Paolo	4
Sliema	2
San Giuliano	3
Totale	123

La loro capacità ascende a 28,926 tonnellate, e l' acqua che in questo momento contengono a 18,008 ton. ; le gebie di recente scavate nella Sliema e S. Giuliano, della capacità insieme di 7,428 tonnellate, sono intieramente vuote pocchissima acqua essendovi introdotta in esse dal tempo della loro costruzione che ebbe fine negli ultimi mesi dell' inverno scorso.

In fine sulla domanda a noi fatta circa il tempo richiesto per empire dall' Acquedotto tutte le cisterne delle 4 Città e Floriana, e nostra opinione che quattro mesi di tempo sarebbe necessario, quale però si potrebbe diminuire ad una metà restringendo il consumo di acqua nei quartieri e publichi stabilimenti e togliendo le communicazioni dirette che esistono coll' Acquedotto.

Dobbiamo soggiungere che il recente nettamento di diversi canali ed il loro rialtamento hanno accrescuito il volume di acqua che scorre nella linea dell' Acquedotto.

Ufficio delle Rendite Territoriale,
e dei Lavori Publici,
Valetta, 12 Luglio, 1861.

(Firmato) Salvatore Borg.
(Firmato) Felice Borg.

Estimate of the expenses required for effecting the works here-under specified in the public aqueducts.

Fauara Aqueduct.

	£	s.	d.
Communicating the spring just acquired at the Fauara with the main duct, by laying down 200 feet of channels, and constructing a small reservoir - - - - - -	12	0	0
Communicating the public tanks at Cospicua, Senglea, and Vittoriosa, with the main line which crosses those towns, by laying down 9,972 feet of 2-inch iron pipes - - - -	649	13	0

Wignancourt Aqueduct.

	£	s.	d.
Making a communication from the reservoir in Porta Reale to Strada Fianco, 368 feet in length - - - -	34	11	4
Repairing the communication of Marina Fountain - - - - -	10	0	0
Continuing to the extent of 230 feet, the communication to Piazza Fosse, Floriana - - - - -	26	0	0
Making a communication from the Officer's quarters, at Floriana, to Strada Mercanto - - - - -	9	10	0
	£741	4	4

Office of Land Revenue and Public Works,
Valetta, 17th July 1861.
(Signed) E. N. Galizia,
Head Surveyor.

Seen.
(Signed) G. Vella, Collector.

No. 8.

Provisions relating to the Public Health contained in the "Laws and Regulations of Police for the Island of Malta and its Dependencies."

The following Acts and omissions are prohibited :

1. To throw or to let fall any dirt, rags, or other matters, in a street or over a street, or to let offensive or stinking materials flow towards a street ; or to transport such materials through a street otherwise than in vehicles or by other covered means ; or to beat or shake dust from carpets, or mats, or other objects, in a street or over a street, except by permission of the police ; or to void urine in any street of the cities of Valetta, Cospicua, Senglea, and Vittoriosa, or of the suburb called Floriana, except in the places appointed for that purpose ; or to deposit or leave in a street filth, or rubbish that may have fallen in the conveyance of the same ; or to deposit on the wall of any enclosure contiguous to a street stones which ought not to be laid or deposited therein.

51. It is prohibited to construct chimneys, ovens, or forges, against a partition wall, although a person's own property, between tenements belonging to different proprietors, or to establish or keep in the neighbourhood of the property of others workshops from which there might be danger of fire, or of explosion, or of noxious exhalations, without a licence from the police, in which shall be specified the distances and works requisite to prevent damage being caused either to a neighbour or to the public health. The differences, however, between the respective proprietors or neighbours on such matters, so far as regards property, shall continue to be cognizable by the Civil Courts.

53. In every house or other building the proprietor shall construct a suitable sink communicating, if it be possible, with the main sewer or with some other outlet according to rule ; and every occupier of a house or other building shall reveal to the police the want of such sink.

54. The proprietor of every house or other building is bound to maintain the sink with the requisite drains and coverings, and with a proper grating affixed to the mouth of each drain, in a good state of repair, and shall repair the sink within such reasonable time as shall be fixed in a notice from the police calling on him to do so.

55. Over every cistern, well, or ditch, which is intended to be kept open in any house, building, or other place, the proprietor shall keep constantly and in good repair a fence at least three palms in height.

56. It is prohibited to leave dirty, corrupt, or stagnant water in undergound or other places, whether within houses or elsewhere, so as to produce injury to the public health, or annoyance to the neighbourhood ; and every person shall take care that, through his negligence, the contents of any sink, or any drain for water or filth, shall not run over or ooze out to the prejudice or annoyance of the occupiers of a contiguous tenement.

57. Whenever it shall be signified or reported to the police that a collection of manure or other noxious or offensive matter exists in any building or other place, to the prejudice of the public health or annoyance of the neighbourhood, the police shall immediately give notice to the proprietor of such manure or other matter, or to the occupier of the place where it may exist, that it must be removed within twenty-four hours after such notice.

58. Whenever any house or other building shall be in such a dirty or unwholesome state as to prejudice the public health, or when the whitewashing, cleaning, or purification of any house or other building may tend to prevent any infectious, contagious, or epidemic sickness which might occur therein, it shall be lawful for the police to order the proprietor or occupier of such house or other building, to whitewash, clean, or purify the tenement in such manner and within such time as may be thought reasonable by the police.

60. No person shall keep slaughter-houses or pigsties in any place or exercise any art or trade which may be prejudicial to the public health or safety, or may annoy the neighbours ; and no person shall keep in any place merchandise which may produce noxious vapours or odours, or which may be prejudicial to the public health or safety.

61. If the annoyance or injury contemplated in the preceding article be not stopped within such period as shall have been prescribed by the Court, the contravener shall be liable, besides the penalty for the contravention, to a penalty not exceeding two pounds sterling for every day during which such annoyance or injury shall continue unremedied after the expiration of the prescribed period.

64. It is prohibited to burn, boil, distil, or otherwise decompose any root, drug, or other thing, in houses, buildings, or other places, causing thereby offensive or dangerous odours or vapours, so as to be prejudicial to the public health or an annoyance to the neighbourhood, without a licence from the police, as prescribed in article 51.

67. No cemetery shall be made at a distance less than two hundred yards from any inhabited house, unless with the consent in writing of the proprietor, or of the tenant or other occupier of such house; and although the prescribed distance be observed, yet, if any prejudice to the public health or annoyance to the neighbourhood could result, the distance shall be increased according to the opinion of competent persons.

72. It is prohibited to bury corpses without the permission of the police.

73. It is prohibited to exhume corpses, or to open any tomb, before one year shall have elapsed since the burial of a corpse therein, without the permission of the police.

74. Except in cases of absolute necessity, the police shall not issue the permission for the burial of corpses before twenty-four hours shall have elapsed since death took place.

75. It is prohibited to bury corpses in any cemetery situate in any place in which the police shall have prohibited burials, and without making use of those sanitary precautions which may be prescribed by the police.

78. The head of the Civil Government is empowered to make regulations in all matters respecting the extent, position, and formation of cemeteries, the manner of burying corpses, and the general police of such places.

81. It is the duty of every person to whom the officer indicated in article 80 may have provided water, to assure himself, that the cistern in which the water is to be contained, and the conduits or tubes through which it must pass be not broken or damaged in any such way that the water supplied may be in any quantity wasted.

82. Every person shall avoid causing, by his negligence, the opening, breaking, or damaging of any lock, earthen pipe, tube, door, or other appurtenance of any reservoir, or other receptacle of public water, or the waste of such water in any other manner.

83. Every person shall avoid causing, by his negligence, any manure, mud, or other noxious or offensive things to be introduced into the fountains, aqueducts, or other places destined for the preservation of the public water; or putrid waters or other offensive matters to percolate into them from sewers, drains, or other places; or the public water to be in any other way rendered foul or unwholesome.

84. It is prohibited to wash animals, clothes, or other things in, or to let animals drink from, fountains in which it is not specially permitted so to do, or to bathe or wash in any fountain or other receptacle destined for the preservation of public waters, or for a public water-course.

86. Every keeper of a slaughter-house shall maintain the same in a wholesome state, and remove the filth therefrom at least once in every twenty-four hours.

87. The head of the Civil Government is empowered to make regulations in regard to the grant of licenees, and the registry and inspection of slaughter-houses.

89. It is prohibited within the limits of the cities of Valetta, Vittoriosa, Cospicua, and Senglea, to slaughter or cause to be slaughtered any animals of the kinds mentioned in the said tariff, in any other place than the slaughter-houses, without a licenee from the police.

91. No person shall neglect to cause to be interred beyond the limits of any inhabited place, within twenty-four hours, the carcase of any animal belonging to the same, which might otherwise cause prejudice to the public health or annoyance to the neighbourhood.

92. The head of the Civil Government is empowered to make regulations for the purpose of prohibiting, ordering, or regulating the removal from one place to another of animals, meat, skins, horns, or other parts of animals, or of straw, hay, or other articles, which might probably infect the atmosphere and cause the spread of contagious disease; for the purpose of purifying the stalls, or other places in which animals may be kept; for the object of arranging the way in which animals which may die in a state of sickness should be disposed of; and also for the purpose of ordering that the appearance of any disease amongst animals be reported.

95. It shall be lawful for any person to destroy any dog or other animal which may be found in the street, and may be reasonably suspected of being attacked with hydrophobia, or of having been bitten by a dog or other animal reasonably suspected of being attacked with hydrophobia.

110. It is prohibited to expose for sale any meat or fish which may be unfit for human food.

111. Any officer of police is empowered to enter into any place kept or used for the preservation or sale of meat or fish, and to search whether there exists therein any meat or fish unfit for human food; and if any be found therein it is competent to the Court to order the same to be destroyed or to be disposed of in any other way, so as to prevent its being used for human food.

112. Every shopkeeper shall keep in a clean and wholesome state both the interior of the shop and the external space around the shop, within reasonable limit to be fixed by the police.

115. It shall be lawful for the head of the Civil Government to make regulations for the better discovery of any fraudulent practices, and for the preservation of good order and cleanliness in the markets.

116. It is prohibited to exercise the trade of baker, maker of bread, or miller, without a licence from the police.

165. It is prohibited to leave in the ports or on the moles any merchandise or other rotten or unwholesome thing which might be prejudicial to the public health, or give rise to a nuisance.

210. No passage boat shall, without a permit from the officer appointed by the said superintendent, approach any vessel before she be admitted to pratique.

No. 9.

ORDINANCE No. 11 OF 1855.

An Ordinance enacted by the GOVERNOR OF MALTA, with the advice and consent of the Council of Government thereof,

To facilitate the practice of vaccination and to make the same compulsory in certain cases.

Preamble.

WHEREAS it is expedient to facilitate the practice of vaccination and to make the same compulsory in certain cases, it is hereby enacted and ordained by his Excellency the Governor, with the advice and consent of the Council of Government, as follows :—

Physicians or Surgeons to be appointed to vaccinate.

1. As soon as possible after the promulgation of this Ordinance, the Head of the Civil Government shall appoint one or more physicians or surgeons for each of the cities of Valetta, Cospicua, Vittoriosa, and Senglea, and their suburbs, for each of the country districts of Malta, and for the islands of Gozo and Comino, to vaccinate such children as shall be brought to them, and such other persons as shall of their own accord present themselves to be vaccinated.

Notices to be issued.

2. The Superintendent of Police shall from time to time publish a notice indicating the places, days, and hours, in which for the period of four months from the date of the publication of such list one or more of the physicians or surgeons aforesaid shall be in attendance for the object indicated in the preceding section.

Attendance of Physicians or Surgeons in appointed places.

One or more of the physicians or surgeons aforesaid shall respectively attend in each of the places which shall be indicated in the manner aforesaid, at least once in each week of every month within the period aforesaid, and shall each time remain in attendance at least four hours.

When children are to be vaccinated.

3. The father of every child, which at the date of the promulgation of this Ordinance has not attained nine full years of age and has not been vaccinated,

shall within four months from the publication of the first notice which shall be issued after the promulgation of this Ordinance present such child, in one of the places and on one of the days indicated in such notice, to the physician or surgeon in attendance, in order that the said child may be vaccinated, and shall moreover bring the said child to the said physician or surgeon on the day appointed by the same in order that he may observe the result of the vaccination.

In cases, however, where any child has not attained three full months of age, the aforesaid period shall commence to run from the day of the publication of the first notice issued after the day on which the said child shall have attained three full months of age.

All children hereafter born to be vaccinated.

4. The father of every child who shall be born after the promulgation of this Ordinance shall present, in the manner aforesaid, such child for the purposes above indicated, within four months from the date of the publication of the first notice issued after three months from the date of the birth of such child.

Certificate if a child is not in a fit state for vaccination. When the child is to be presented again.

5. If the physician or surgeon aforesaid is of opinion that any child presented to him is not in a fit state to be successfully vaccinated, he shall deliver to the person who presented the child a certificate containing such opinion; and the father of the child shall again present the child within four months from the publication of the first notice following.

Certificate of vaccination.

6. If the vaccination shall have been successful the physician or surgeon aforesaid shall deliver to the person who presented the child a certificate of such vaccination, and if the vaccination shall not have taken good effect, the father of the child shall again present the said child for the purposes indicated in section 3, at such time as shall be pointed out to him by the physician or surgeon.

Certificate that a child is insusceptible.

Moreover, in cases where the physician or surgeon is of opinion that a child is insusceptible of vaccination, he shall give to the person who presented the child a certificate of such opinion, and it shall no longer be necessary to present such child for vaccination.

Cases of children vaccinated, but not by an appointed Physician or Surgeon.

7. A father, who shall have caused his child to be successfully vaccinated by a physician or surgeon other than those appointed by the Head of the Civil Government according to the provision of section 1, shall obtain from such physician or surgeon a certificate of the vaccination and of the success of the same, and shall deliver such certificate to the Superintendent of Police, or to the Syndic or the Inspector of Police of the place of his residence, within the period within which, in the absence of such vaccination, he would have been bound to present the child for vaccination.

Failing th father duties imposed on mother or others.

8. In case of the absence, death, or incapacity of the father of the child, the duties imposed by this Ordinance on the father shall be performed by the mother or by such other person as may have the care of the child.

Penalty.

9. Any contravention against any of the provisions of this Ordinance committed by the father, or in the case contemplated in section 8, by the mother or other person having the care of the child, shall subject the contravener to an *ammenda*, not exceeding twenty shillings sterling, recoverable by civil process on the demand of any officer of executive Police before a Court of Judicial Police of the island in which the contravener resides, or, in the case of a person residing in a country district of Malta, before the Court of the Syndic of such district.

Exception as to Pena ties.

If the contravener should allege some just cause or excuse to the satisfaction of the Court, it shall be lawful for the Court to remit the fine, and to give to the contravener such admonition as the Court may consider requisite.

No fees allowed.

10. It shall not be lawful for the physicians or surgeons, appointed as aforesaid by the Head of the Civil Government, to receive any remuneration from any person, who at the hours and places appointed for the vaccinations shall present any child for such purpose, without any distinction of class or of place of residence of such person.

Passed the Council of Government at Sitting No. 5.
15th March 1855.

R. C. LEGH,
Clerk to the Council.

Assented to this day, 17th March 1855,
Palace Valetta.

(L.S.)
WM. REID,
Governor.

By command,
HENRY LUSHINGTON,
Chief Secretary to Government.

No. 10.

RETURN of VACCINATION, showing the Number of Children successfully vaccinated in MALTA and GOZO, from 14th March to 6th July 1861.

Districts.	By Police Physicians.	By Medical Practitioners.	Total.
MALTA.			
Valetta and Floriana - - - -	645	359	1,004
Senglea, Cospicua, and Vittoriosa - -	1,089	910	1,999
1st District - - - - - -	495	264	759
2nd ,, - - - - - - -	386	—	386
3rd ,, - - - - -	704	100	804
4th ,, - - - - - -	700	30	730
5th ,, - - - - - -	683	28	711
6th ,, - - - - - - -	203	5	208
7th ,, - - - - - -	438	20	458
Total - - -	5,343	1,716	7,059
GOZO.			
District of Rabato - - - -	208	4	212
,, Nadur - - - -	139	—	139
Total - - -	347	4	351
Grand Total, Malta and Gozo	5,690	1,720	7,410

Police Office, Valetta, 14th October 1861.
D. GHIO, Chief Police Physician.

No. 11.

Return of Children who have died of Small-Pox in Malta and Gozo, from 26th January (first Case) up to this Day.

Districts.	Jan.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Total.
Birchircara - - -	1	8	8	20	10	3	–	–	–	50
Cospicua - - -	–	2	–	1	1	2	5		–	14
Notabile - - -	–	–	1	–	–	1	2		–	4
Balzan - - -	–	–	–	4	1	2	3	3	–	13
Senglea - - -	–	–	–	1	–	–	–	–	–	1
Curmi - - -	–	–	–	1	–	–	–	–	–	1
Zabbar - - -	–	–	–	–	1	1	1	–	–	3
Valetta - - -	–	–	–	–	2	1	9	19	25	56
Nazaro - - -	–	–	–	–	2	1	4	–	–	7
Floriana - - -	–	–	–	–	–	1	–	–	–	1
Rabato of Gozo - - -	–	–	–	–	–	–	–	1	–	1
Total - - -	1	10	9	27	17	12	24	26	25	151

Population, Malta - - - - 123,401
„ Gozo - - - - - 16,441
139,842

Police Office, Valetta, October 15, 1861,
D. Ghio, Chief Police Physician.

No. 12.

Government Notice.

With a view to the better provision of accommodation for the poorer working classes, and the obvious importance to be attached to constructing such dwellings on the best principles, for securing convenience of domestic arrangement, economy of space and rent, coupled with good drainage and ventilation ; his Excellency the Governor is pleased hereby to signify, that the Government are prepared to receive plans and designs from all persons who may wish to submit them for such class of buildings.

His Excellency is further pleased to direct that two premiums, the first of 25*l.* and the second of 10*l.*, be allotted for the two designs declared by a Board, to be specially appointed for their examination, to be the most eligible for the purpose contemplated, and the highest in point of merit.

The dimensions of the site to be allotted for such buildings are 158 feet by 131, with three frontages.

A plan of the same can be seen on application at the Chief Secretary's Office.

The designs to be sent in to the Chief Secretary on or before the 30th November next.

By command,
Wilford Brett,
Acting Chief Secretary to Government.

Palace, Valetta,
October 2, 1858.

No. 13.

Department of Land Revenue and Public Works,
Valetta, 18th October 1861.

His Excellency the Governor having, with a view of continuing the execution of the scheme referred to in the Government Notice of the 2nd of October 1858, for the construction of dwellings for the use of the poorer classes, been pleased to direct that a large portion of the building at Floriana, called "Franconi," be granted on a perpetual lease, on the condition that two dwelling houses, separated by streets, be built upon it, in accordance with a plan which may be seen in this office, or in accordance with such other plan as may receive His Excellency's approbation ; notice is hereby given that sealed tenders will be received at this office until 12 o'clock on Saturday, the 30th of November next, from persons desirous of obtaining the grant of the aforesaid lease.

Tenders will be received either for one only, or for both, of the sites destined for the said dwelling houses.

No tender will be considered as accepted, until the acceptance thereof has been communicated to the party tendering, by a letter from the undersigned.

The principal conditions of the contract may be known on application at this office.

A deposit of 25*l.* is required with each tender.

G. Vella, Collector.

No. 14.

Ordinance No. XIV. of 1859.

An Ordinance enacted by the Governor of Malta, with the advice and consent of the Council and Government thereof,

For the better discovery of certain adulterations of drinks or food destined for being sold or issued in the island of Malta and its Dependencies, and for preventing the sale or issue of certain adulterated food or drinks.

Preamble.

Whereas it is expedient to adopt more effectual measures for the discovery of certain adulterations of drinks or food destined for being sold or issued in the island of Malta and its dependencies, and to prevent the sale or issue of certain adulterated food or drinks, it is hereby enacted and ordained by his Excellency the Governor, with the advice and consent of the Council of Government, as follows :

Police to seize drinks or food for ascertaining whether they are injurious to health.

Article 1. It shall be lawful for the police to enter any shop, magazine, or other place in which drinks or food may be exposed for being sold or issued in the island of Malta and its Dependencies, or may be kept in deposit to be there or in any other place and at any time, sold or issued in the said islands, and to seize such drinks or food in order to cause them to be examined or analyzed, for the purpose of ascertaining whether they are adulterated in such manner as to be, from the mixture therein contained, injurious to health.

Mode of proceeding in such cases.

2. In every case of seizure of drinks or food, made by virtue of the provision contained in the preceding article, the police shall summon the person from whose possession such articles shall have been seized, to appear before the Court of Judicial Police, and show cause why such articles should not be subjected to the examination or to the analysis aforesaid ; and the Court, if it shall be of opinion that the seizure was made agreeably to the provision of the preceding article, shall order the said articles to be, according to their nature, examined or analyzed by competent persons to be by the said Court appointed as *periti*.

Appointment of periti.

3. Three *periti* shall be appointed in cases where, regard being had to the nature of the articles seized and to the circumstances of the case, the Court, shall

not consider it to be sufficient to appoint one individual only.

Examination or analysis how to be made.

The examination or the analysis shall be made upon all articles seized, or upon a portion of them, as the *periti* shall deem it necessary.

In cases where three *periti* are appointed, if they be not unanimous the Court shall adopt the opinion of the majority.

Report by pariti, how to be made.

4. The persons appointed as aforesaid, shall make to the above-mentioned Court a report in writing, which shall be read in the presence of the person from whose possession the things examined or analyzed shall have been seized; and if from such report, to be confirmed on oath, it shall result that the drinks or foods seized are adulterated so as to be, from the mixture therein contained, injurious to health, the Court shall sentence the person from whose possession such articles shall have been seized, to pay all judicial costs, including the fee due to the persons who made the examination or the analysis; and shall order all the said articles to be forfeited. If, on the contrary, it shall result that such articles are not adulterated, or that they are not injurious to health, the Government shall make good any damage, which by the examination or by the analysis aforesaid may have been caused to the articles seized or to any portion thereof.

Applicability of this Ordinance.

5. The provisions of this Ordinance do not supersede any other provisions of the law, with respect to the punishments awarded against the persons who may have sold or issued adulterated drinks or food, or with respect to the manner of proving the adulteration of such articles, or with respect to other matters, whenever the case may fall under such other provisions.

Passed the Council of Government at Sitting No. 74
June 10, 1859.
G. B. Trapani, Clerk to the Council.

Assented to this 23rd day of July 1859.
J. Gaspard Le Marchant, Governor.
(L.S.) By command,
Wilford Brett,
Acting Chief Secretary to Government.

Extract from the Criminal Laws for the Island of Malta and its Dependencies.

Article 234. "Whosoever shall knowingly sell or "issue any adulterated drinks or food, which from "the mixture therein contained are prejudicial to "health, shall be punished with imprisonment from "seven months to one year.

"In cases of small importance, the punishment of "multa or of ammenda shall be awarded.

"In all cases the drinks and the food shall be "forfeited."

Multa (fine), its maximum is 20*l.*, and its minimum 5*l.* In default of payment, the multa is converted into imprisonment for a term not exceeding one day for every 10*s.*, such imprisonment in no case to exceed one month.

Ammenda (fine), its maximum is 5*l.*, and its minimum no less than 2*s.* 6*d.* In default of payment the ammenda is converted into detention for a term not exceeding one day for every 2*s.* 6*d.*, such detention in no case to exceed one month.

No. 15.—Malta.—Table showing the Groups of Diseases by which the Sickness and Mortality among the Troops have been caused in the Two Periods (1837–46, and 1859) respectively.

—	1859.—Strength 5,310.						1837–46. Average Annual Strength 2,117.	
	Admitted into Hospital.	Deaths in Malta.	Deaths of Invalids.	Total died.	Annual ratio per 1,000 of Strength.		Annual ratio per 1,000 of Strength.	
					Admitted.	Died.	Admitted.	Died.
I.								
1. Miasmatic diseases - -	2,996	59	–	59	564·2	11·11	497·7	6·80
2. Enthetic - - - - -	797	–	–	–	150·1	–	98·8	–
3. Dietic - - - - -	14	–	–	–	2·6	–	·05	·05
4. Parasitic - - - - -	60	–	–	–	11·3	–	3·6	–
II.								
1. Diathetic - - - -	12	–	–	–	2·3	–	2·4	·09
2. Tubercular - - -	78	9	3	12	14·7	2·26	13·9	6·38
III.								
Diseases of the—								
1. Nervous system - - -	107	6	1	7	20·2	1·32	15·4	·85
2. Circulatory „ - - -	52	4	1	5	9·8	·94	4·3	·42
3. Respiratory „ - - -	488	9	–	9	91·9	1·69	131·1	1·65
4. Digestive „ - - -	296	1	–	1	55·7	·19	101·65	1·23
5. Urinary „ - - -	6	1	–	1	1·1	·19	1·1	–
6. Reproductive „ - - -	6	–	–	–	1·1	–	·3	–
7. Locomotive „ - - -	7	–	–	–	1·3	–	1·4	–
8. Integumentary „ - - -	1,081	–	–	–	203·6	–	135·6	·14
IV.								
4. Diseases of Nutrition - -	2	–	–	–	·4	–	·1	·05
V.								
1. Accidents - - - -	427	7	–	7	80·4	1·32	99·7	1·51
3. Homicide - - - -	–	–	–	–	–	–	–	–
4. Suicide - - - -	–	–	–	–	–	–	–	·19
5. Execution - - - -	–	–	–	–	–	–	–	–
6. Corporal punishment - -	20	–	–	–	3·8	–	10·7	–
Diseases not stated - - -	28	–	–	–	5·3	–	2·1	–
Total - -	6,477	96	5	101	1,219·8	19·02	1,119·9	19·36

No. 16.

Malta.—Table showing the Ratio of Admissions and Deaths from Miasmatic Diseases among the Troops during Two Periods.

——	1859.	1837–46.
Annual ratio of Admissions per 1,000 - - -	564·2	497·7
„ Deaths „ - - -	11·11	6·80

No. 17.

Malta.—Table showing the Nature of the Miasmatic Diseases and their comparative Prevalence among the Troops during the same Two Periods.

——	1859.		Annual ratio per 1,000.			
			1859.		1837–46.	
	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
Eruptive Fevers - - - -	2	–	·4	–	1·6	·05
Paroxysmal „ - - - -	59	–	11·1	–	2·8	·28
Continued „ - - - -	1,431	47	269·5	8·85	207·3	1·46
Dysentery, Diarrhœa, &c. - -	811	10	152·7	1·88	150·5	2·41
Sore Throat - - - -	79	–	14·9	–	17·1	–
Ophthalmia - - - -	308	–	58·	–	65·9	–
Rheumatism - - -	293	2	52·2	·38	42·7	·09

No. 18.

Medical Statistics of the Garrison, Malta, 10 years, from 1st April 1849 to 31st March 1859.

Total aggregate strength for the period, non-commissioned officers and men, British troops 33,810 ; native troops, 5,686.

Diseases.	British Troops. Total Numbers.		Native Troops. Total Numbers.	
	Admitted.	Died.	Admitted.	Died.
Fevers, intermittent - - - -	82	2	5	—
„ remittent - - - -	643	5	—	—
„ yellow - - - - -	2	1	—	—
„ C. continued - - - -	7,954	78	265	2
„ Typhus - - - -	9	4	3	2
„ eruptive - - - -	78	3	6	—
Cholera - - - - - -	298	163	20	13
Diarrhœa - - - - - -	3,203	14	325	1
Dysentery - - - - - -	580	31	9	2
Hepatic diseases - - - -	344	11	15	1
Rheumatism - - - - - -	1,301	4	251	—
Phthisis - - - - - - -	201	67	14	7
Other Pulmonary diseases - - -	2,755	38	254	4
All other diseases - - - -	20,685	67	2,424	9
Total - - - -	38,135	488	3,591	41

Dated this 11th day of February 1861.

Jn. Forrest, M.D.
Inspector-General of Hospitals, P.M.O.

No. 19.

RETURN of ADMISSIONS into the MILITARY HOSPITALS, MALTA, from April 1855 to March 31st, 1860.

Year.	Disease.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Strength.
		MONTHS.												
1855-56	Fevers - -	13	20	39	143	55	177	31	39	36	15	26	19	
	Other diseases	134	144	184	179	150	296	294	236	165	139	121	124	1,741
	Total -	147	164	223	322	205	473	325	275	201	154	147	143	—
1856-57	Fevers - -	22	36	339	661	432	401	153	45	36	26	45	50	
	Other diseases	107	198	400	688	831	760	720	600	496	508	390	535	7,239
	Total -	129	234	739	1,349	1,263	1,161	873	645	532	534	435	585	—
1857-58	Fevers - -	42	67	68	211	92	80	31	24	47	28	40	67	
	Other diseases	442	383	361	386	409	352	347	295	281	191	218	356	6,160
	Total -	484	450	429	597	501	432	378	319	328	219	258	423	—
1858-59	Fevers - -	34	41	173	213	133	116	72	37	33	24	28	32	
	Other diseases	354	375	423	426	485	378	266	212	289	323	326	376	4,899
	Total -	388	416	596	639	618	494	338	249	322	347	354	408	—
1859-60	Fevers - -	36	62	229	276	197	248	165	116	69	60	32	29	
	Other diseases	394	423	472	549	581	561	551	431	416	409	354	351	6,316
	Total -	430	485	701	825	778	809	716	547	485	469	386	380	—

WM. L. LANGLEY, M.D.,
Surgeon Major,
P. M. O.

No. 20.

MALTA.—ADMISSIONS for FEVER among troops from April 1st, 1859, to Dec. 31st, 1859.

Regiment.	Stations.	Admissions.	Deaths.	Remarks.
2—3rd.	Floriana from April 1st to Aug. 26th. Isola Gate, San Francesco, St. Elena Gate, Vittoriosa, from Aug. 27th to Dec. 31st.	178	4	Average Strength 872.
2—15th.	Fort Verdala from 1st April to 26th Aug. Floriana from 27th Aug. to 25th Nov. Fort Manoel from 26th Nov. to 31st Dec.	156, of which 1 intermittent.	5	Average Strength 697.
2—22nd.	Fort Manoel from May 21st to Nov. 24th. Floriana from Nov. 25th to Dec. 31st. This battalion did not arrive on this station until the 21st of May 1859.	289, of which 8 intermittent.	3	Average Strength 793.

No. 21.

MALTA.—ADMISSIONS FOR FEVER.

2nd Bat. 23rd Regiment.		
From Fort Ricasoli, -	257	From March 1st, 1859.
Died - -	6	To Sept. 26th, 1859.
Average strength - - - -	872	
From St. Elmo -	79	From Sept. 27th, 1859.
Died - -	11	To Dec. 31st, 1859.
Average strength - - - - - -	857	
4th Bat. Rifle Brigade.		
From St. Elmo -	74	From March 1st, 1859.
Died - -	2	To Sept. 26th, 1859.
Average strength - - - -	824	
From Ricasoli -	58	From Sept. 27th, 1859.
Died - -	6	To Dec. 31st, 1859.
Average strength - - - -	873	

From the annexed return, No. 20, it may be seen that fever also prevailed to a great extent this year, in the 2nd Bat. of the 3rd, 2nd Bat. 15th, and 2nd Bat. of the 22nd Regiment.

The 2nd Bat. of the 23rd Regiment moved from Ricasoli on the 26th of September 1859, and relieved the 4th Bat. Rifle Brigade at St. Elmo, who took over the quarters at Fort Ricasoli, previously occupied by the 2nd Bat. of the 23rd Regiment.

W. L. LANGLEY, M.D.,
Surgeon Major,
P. M. O.

No. 22.

ADMISSIONS for FEVERS, from January 1st 1860, to December 31st 1861.

Regiment.	Station.	Admissions.	Deaths.	Average Strength.
2nd Bat. 3rd Regt.	Fort Verdala	249 of which 2 Typhoid 1 Intermittent	6	859
2nd Bat. 15th Regt.	Fort Manoel, Isola Gate, San Francesco.	98 „ 2 Typhoid 2 Intermittent	2	852
1st Bat. 22nd Regt.	Couvre Porte, Vittoriosa	170 „ 2 Typhoid 1 Intermittent	1	831
2nd Bat. 22nd Regt.	Floriana	237 „ 17 Typhoid	7	834
2nd Bat. 23rd Regt.	Lower St. Elmo	140 „ 11 Typhoid 3 Intermittent	3	861
4th Bat. Rifle Brigade.	Ricasoli	254 „ „	1	857
Royal Malta Fences	St. James' Cavalier	6 „ „	0	608

W. L. LANGLEY, M.D.
Surgeon Major, P. M. O.

No. 23.

TABLE showing the NUMBER of MEN in all the BARRACKS in MALTA, for every 50 cubic feet of space, from 250 to 800 and upwards, and for every 5 feet of superficial area from 25 to 70 and upwards.

Name of Barracks.	CUBIC FEET.										SUPERFICIAL FEET.									
	250 to 300	400 to 450	450 to 500	500 to 550	550 to 600	600 to 650	650 to 700	700 to 750	750 to 800	Above 800.	25 to 30	30 to 35	35 to 40	40 to 45	45 to 50	50 to 55	55 to 60	60 to 65	65 to 70	Above 70.
	Number of Men.	Number of Men.	Number of Men.	Number of Men.	Number of Men.	Number of Men.	Number of Men.	Number of Men.	Number of Men.	Number of Men.	Number of Men.	Number of Men.	Number of Men.	Number of Men.	Number of Men.	Number of Men.	Number of Men.	Number of Men.	Number of Men.	Number of Men.
Upper St. Elmo	-	-	55	148	22	-	-	-	-	-	-	-	110	108	-	7	-	-	-	-
Lower St. Elmo	-	-	-	-	38	-	566	144	-	-	-	-	-	-	422	230	96	-	-	-
Marsamuscetto	-	-	-	-	-	-	-	-	84	-	-	-	-	-	84	-	-	-	-	-
St. James' Cavalier	-	-	-	-	64	-	-	-	-	72	-	-	-	-	136	-	-	-	-	-
St. Peter's Lower Counterguard	-	56	-	41	112	-	-	19	-	41	56	28	13	112	19	-	41	-	-	-
Floriana Barracks	-	-	-	54	-	46	-	460	-	-	-	-	100	460	-	-	-	-	-	50
St. Francis' Floriana	-	-	39	32	45	-	23	36	20	134	71	36	-	133	89	-	-	-	-	-
Ricasoli	-	-	-	-	190	222	-	-	-	-	-	62	7	324	-	19	-	-	-	-
St. Angelo	-	-	-	84	19	15	-	-	-	-	-	67	43	8	-	-	-	-	-	-
Couvre Porte, Vittoriosa	-	-	-	-	20	29	9	4	-	-	-	-	-	11	6	12	4	12	9	8
Isola Gate	-	-	-	-	-	277	-	-	-	-	-	-	24	48	46	63	64	-	-	32
St. Francis di Paola	-	-	-	-	-	125	29	-	-	-	-	-	23	93	31	-	-	-	7	-
St. Elena Gate	-	192	-	-	-	-	-	-	-	-	-	192	-	-	-	-	-	-	-	-
Verdala	-	-	690	-	-	-	-	-	-	-	-	-	-	690	-	-	-	-	-	-
St. Salvatore	-	-	-	-	52	71	24	-		-	-	-	-	14	-	-	-	12	-	7
Zabbar Gate	-	-	-	-	-	101	-	-	-	-	-	-	12	45	-	44	-	-	-	-
St. Clement's	-	-	-	-	-	-	48	-	8	-	-	-	-	-	48	8	-	-	-	-
Polverista Gate	-	-	-	-	252	-	-	-	-	-	-	-	-	252	-	-	-	-	-	-
Zeitun Gate	-	-	-	-	-	41	-	-	-	-	-	-	-	15	-	15	11	-	-	-
Fort Manoel	60	-	-	-	78	-	55	40	-	84	-	-	-	66	44	60	54	-	42	51
Fort Tigne	-	51	-	21	34	-	-	-	-	-	-	-	32	-	54	-	-	20	-	-
Chambray, Gozo	-	50	45	150	150	-	-	-	-	-	-	-	345	50	-	-	-	-	-	-
Total	60	349	829	530	1,076	927	754	703	112	331	127	385	709	2,429	979	458	270	44	58	148

No. 24.

TABLE showing the NUMBER of BEDS in all the HOSPITALS, for every 100 cubic feet from 400 to 4,000, and for every 20 superficial feet from 30 to 120.

Name of Hospital.	CUBIC FEET.														SUPERFICIAL FEET.					
	400 to 500	500 to 600	700 to 800	800 to 900	900 to 1,000	1,000 to 1,100	1,100 to 1,200	1,200 to 1,300	1,400 to 1,500	1,500 to 1,600	1,600 to 1,[illegible]00	1,800 to 2,000	2,000 to 3,000	3,000 to 4,000	30 to 40	40 to 60	60 to 80	80 to 100	100 to 120	Above 120.
	Number of Beds.	Number of Beds.	Number of Beds.	Number of Beds.	Number of Beds.	Number of Beds.	Number of Beds.	Number of Beds.	Number of Beds.	Number of Beds.	Number of Beds.	Number of Beds.	Number of Beds.	Number of Beds.	Number of Beds.	Number of Beds.	Number of Beds.	Number of Beds.	Number of Beds.	Number of Beds.
General Hospital, Valetta	–	–	26	–	42	–	7	–	9	47	30	10	113	96	11	15	83	135	129	7
Vittoriosa Hospital	–	26	–	–	26	22	66	–	–	–	–	–	–	–	26	–	68	46	–	–
Vittoriosa hired Hospital	4	–	19	9	–	20	4	–	–	–	–	–	–	–	4	24	24	4	–	–
Spinola Hospital	–	–	–	13	9	–	13	6	–	–	1	–	1	–	–	–	28	13	1	1
Total	4	26	45	22	77	42	90	6	9	47	31	10	114	96	41	39	203	198	130	8

APPENDIX TO REPORT ON THE IONIAN ISLANDS.

No. 1.

Five Years, METEOROLOGICAL OBSERVATIONS from January 1855 to January 1860, at CORFU.

Months.	Barometer Mean.	Mean Temperature.	Mean Daily Range.	Mean Maximum	Mean Minimum.	Mean Dry Bulb.	Mean Wet Bulb.	Rain Inches.	Rainy Days per Month.	Winds.		
										Force in lbs.	Strength.	Direction.
	in.	°	°	°	°	°	°					
January - -	29·922	52·3	16·8	60·4	43·6	48·8	42·2	8·76	12	46·1	Gales	N.E.
February - -	29·970	55·6	12·5	61·1	48·6	52·5	46·1	3·77	8	42·1	Moderate	E.
March - -	29·865	58·	16·6	65·1	48·5	55·4	50·6	3·71	9	43·4	Gales	E.
April - -	29·803	64·7	16·3	72·5	56·2	62·5	56·9	3·34	7	51·3	High winds	S.E.
May - - -	29·852	69·4	18·	79·	61·	67·7	61·7	3·18	6	23·1	Calm	S.E.
June - - -	29·883	78·5	17·1	86·7	69·6	72·3	66·2	1·71	0·4	26·1	Calm	N.
July - - -	29·875	84·6	16·7	93·9	77·2	81·4	73·1	0·16	3	38·4	Calms, occasional storms	N.W.
August - -	29·858	84·9	16·9	93·1*	76·2	83·9	74·5	1·24	2	28·2	Calms	N.W.
September - -	29·958	76·8	15·3	83·9	68·6	70·7	64·3	6·05	7	32·7	Moderate	S.E.
October - -	29·998	76·5	16·4	84·	67·6	70·2	64·	3·83	6	34·6	Moderate	S.E.
November - -	29·977	65·8	17·8	74·7	56·9	61·6	56·1	7·2	12	47·8	High winds	S.E.
December - -	29·985	58·3	20·1	66·9	46·8	52·7	47·9	8·87	14	40·8	Moderate	N.E.

* August 15, 1859, Maximum Temperature = 99°·9.

No. 2.

TABLE of MORTALITY of the TOWN and SUBURBS of CORFU, from the 1st of January 1855 to the 31st December 1860.

Description of Diseases.	1855.		1856.		1857.		1858.		1859.		1860.		Total Six Years.
	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	
Croup - - -	14	1	2	6	2	8	4	3	1	4	3	4	52
Febris typhoid -	26	17	16	14	12	5	16	14	9	4	11	4	148
„ typhus -	1	—	1	1	—	—	—	—	—	—	—	—	3
„ intermit. -	2	7	1	—	3	1	—	—	—	—	—	—	14
„ continua -	—	—	1	—	—	—	4	3	9	5	6	5	33
Erysipelas - -	1	1	1	1	1	1	1	1	1	—	—	1	10
Dysenteria - -	5	6	6	8	8	5	6	5	5	3	3	8	68
Diarrhœa - -	5	10	7	8	14	12	6	7	8	4	15	6	102
Cholera spasmodi. -	200	248	—	—	—	—	—	—	—	—	—	—	448
Syphilis - -	2	1	1	—	1	1	—	—	1	1	1	—	9
Strictur. ureth. -	—	—	—	—	—	—	—	—	1	—	2	—	3
Hydrophobia - -	1	—	—	—	—	—	—	—	—	—	—	—	1
Leprosy - -	1	1	—	—	—	—	—	—	—	—	—	—	2
Scorbutus - -	—	—	—	—	—	—	—	—	—	—	1	—	1
Rachitis -	—	—	—	1	3	2	—	—	—	—	—	1	7
Podagra - -	1	—	—	—	—	—	—	—	—	—	—	—	1
Anasarca - -	5	3	8	7	6	3	1	—	7	4	3	4	51
Carcinoma - -	2	4	5	2	7	7	8	8	2	2	9	7	63
Scirrhoma - -	5	3	1	2	2	—	1	—	3	—	—	2	19
Scrofula -	34	21	24	19	7	6	18	23	4	4	4	3	167
Mesenteric disease -	36	27	26	29	32	34	31	23	30	28	24	27	347
Peritonitis - -	2	6	—	5	3	2	1	4	6	1	3	5	38
Hæmoptysis - -	—	—	—	1	2	1	—	—	2	—	2	—	8
Phthisis pulmonalis	54	37	34	27	32	25	37	38	36	33	27	28	408
Meningites - -	6	4	12	4	12	9	13	8	21	11	17	14	131
Encephalitis - -	14	11	3	6	4	9	7	6	7	5	6	5	83
Myelitis - -	—	—	2	—	2	1	1	—	3	1	—	1	11
Apoplexia - -	30	22	21	19	26	19	16	17	23	21	30	15	259
Paralysis - -	8	8	4	—	—	—	2	1	5	4	3	—	35
Delirium tremens -	—	—	—	—	—	—	—	—	2	—	1	—	3
Dementia - -	—	—	—	—	1	1	—	2	—	—	—	1	5
Epilepsia - -	2	4	1	1	—	2	1	1	—	1	5	—	18
Tetanus - -	2	1	3	—	2	—	3	—	4	1	3	1	20
Eclampsia - -	20	8	13	9	12	15	14	12	12	12	15	13	155

Table of Mortality, &c.—*continued.*

Description of Diseases.	1855.		1856.		1857.		1858.		1859.		1860.		Total Six Years.
	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	
Otitis	—	—	—	—	—	—	—	—	1	—	—	—	1
Morb. cordis	23	20	28	25	21	19	23	18	22	35	17	23	274
Angina pectoris	—	—	—	—	3	—	1	—	1	—	—	—	5
Syncope	—	—	2	—	—	—	—	—	—	2	—	—	4
Arteritis	—	—	2	—	—	—	—	—	—	—	—	—	2
Phlebitis	—	—	1	—	—	1	—	—	1	1	1	—	5
Laryngitis	10	2	—	2	2	1	8	6	1	2	5	1	40
Bronchitis	31	37	27	28	23	22	42	36	27	36	33	23	365
Pleuritis	4	6	2	—	1	—	—	—	2	3	—	—	18
Hydrothorax	6	3	2	3	3	8	1	1	3	1	3	—	34
Empyema	5	4	10	6	10	4	—	—	4	3	5	7	58
Apoplex. pulm.	4	3	12	8	16	8	5	2	6	3	5	3	75
Pneumonia	10	13	13	15	20	9	16	12	14	6	17	6	151
Asthma	4	1	1	—	1	1	—	—	—	—	—	2	10
Gastritis	6	7	7	6	12	10	5	11	12	10	10	12	108
Enteritis	12	18	6	7	11	10	10	11	15	16	14	12	142
Ileus	—	—	—	—	—	—	—	—	—	—	—	3	3
Hernia	4	—	1	—	—	—	—	—	—	—	—	1	6
Colica	4	—	—	2	1	2	—	—	—	—	1	—	10
Hæmatemesis	—	—	—	2	—	—	—	—	—	—	—	—	2
Mælena	—	—	1	—	—	—	1	—	—	—	—	—	2
Hæmorrhois	—	—	—	—	1	1	—	6	—	—	1	2	11
Fistula	—	—	1	—	—	—	—	—	—	—	—	—	1
Splenitis	—	—	—	—	1	1	—	—	—	—	—	—	2
Hepatitis	1	1	2	4	3	2	3	3	2	3	3	4	31
Ascites	—	—	1	2	2	3	—	—	—	—	—	—	8
Nephritis	—	—	—	1	—	1	1	—	1	1	—	—	5
Ischuria	—	2	—	—	—	—	—	—	—	—	—	—	2
Diabetes	—	—	—	—	—	—	—	—	—	—	1	2	3
Calculus vesicæ	—	—	1	—	—	—	—	—	—	—	—	—	1
Cystitis	—	—	—	—	2	—	—	—	2	2	—	—	6
Tumor uter.	—	7	—	2	—	—	—	—	—	—	—	2	11
Arthritis	—	—	—	1	1	—	—	—	—	—	—	—	2
Ulcus	—	—	—	—	—	—	—	—	—	—	2	—	2
Natus Mortuus	18	—	12	—	10	—	15	—	24	—	23	—	102
Premat. birth	12	—	13	6	12	11	18	7	10	8	9	10	116
Atelectas. organ.	12	—	10	4	8	7	10	10	3	3	9	6	82
Dentitio	5	—	4	—	5	4	4	1	3	2	4	2	34
Partus	—	1	—	1	—	4	—	—	—	1	—	2	9
Senectus	21	18	9	7	14	13	10	6	12	14	11	7	142
Atrophia	16	25	15	11	17	14	16	3	25	17	10	12	181
Chronic. catarrh	—	—	—	—	3	3	9	7	8	6	7	15	58
Debility	13	15	18	22	19	16	16	17	12	14	24	23	209
Suffocatio	—	1	1	—	—	—	—	—	—	—	—	—	2
Fracture	2	—	1	—	—	—	—	—	—	—	—	—	3
Vulnus	4	—	1	—	—	—	1	—	1	1	1	—	9
Accid. death	—	—	—	—	2	1	4	3	—	—	—	—	10
Hydrocephal.	10	10	10	2	18	16	12	11	13	15	7	5	129
Asphyxia	—	—	—	—	3	3	—	2	2	—	1	1	12
Chlorosis	—	—	—	—	—	—	—	2	—	—	—	2	4
Hypertrophia	—	—	—	—	—	—	—	—	1	1	1	—	3
Spasm. cough	—	—	—	—	2	5	1	—	6	6	—	1	21
Sudden death	—	—	—	—	—	—	—	—	1	1	2	1	5
Elephantiasis	—	—	—	—	—	—	—	—	—	1	—	—	1
Ostitis	—	—	—	—	—	—	—	—	—	—	1	—	1
Total of deaths	716	645	407	337	441	369	423	351	437	363	423	345	—

Average of Deaths per Year.

Males	474
Females	401
	*875

* Including 200 Males and 248 Females died of Cholera in the year 1855.

POPULATION.

——	Males.	Females.
Town	9,245	8,454
Suburbs	4,501	3,812
Total	13,746	12,266

General Health Office, Corfu, 5th November 1861.
Visé E. F. Baer, Director-General.
Nico. Rodili, Chief Clerk.

APPENDIX No. 3.

STATISTICS of the CIVIL HOSPITAL in CORFU from the Year 1855 to the Year 1860.

—	Detail of the Diseases.	1855.				1856.				1857.				1858.				1859.				1860.				Total.			
		Admissions.		Deaths.		Admissions.		Deaths.		Admissions.		Deaths.		Admissions.		Deaths.		Admissions.		Deaths.		Admissions.		Deaths.		Admissions.		Deaths.	
		Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.
1	Fever, ephemeral	2	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	4	–	–	–
2	„ adynamic	1	1	1	1	–	–	–	–	–	–	–	–	–	–	–	–	2	–	1	–	4	–	2	–	7	1	4	1
3	„ typhoid	3	1	1	1	4	1	2	1	6	–	3	–	2	–	2	–	1	–	1	–	2	–	1	–	18	2	10	2
4	„ gastric	6	–	–	–	8	2	1	–	3	1	1	–	5	–	1	–	–	–	–	–	16	1	–	–	38	4	3	–
5	„ rheumatic	39	5	–	–	14	2	–	–	31	4	–	–	41	–	–	–	15	–	–	–	21	2	–	–	161	13	–	–
6	„ nervous	–	–	–	–	1	–	1	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	2	–	1	–
7	„ intermittent, simple	27	–	–	–	42	4	–	–	25	2	–	–	35	1	–	–	21	–	–	–	48	–	1	–	198	7	1	–
8	Fever, intermittent, pernicious	1	–	–	–	1	–	–	–	1	–	–	–	–	–	–	–	2	–	1	–	3	1	–	–	8	1	1	–
9	Erysipelas	2	–	1	–	6	1	–	–	2	–	1	–	3	–	–	–	5	–	1	–	2	–	–	–	20	1	3	–
10	Measles	–	–	–	–	–	–	–	–	5	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	6	–	–	–
11	Chicken pox	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2	–	–	–	–	–	–	–	2	1	–	–
12	Anæmia	–	–	–	–	–	–	–	–	–	–	–	–	3	–	–	–	–	–	–	–	–	–	–	–	3	–	–	–
13	Hydroæmia	1	–	–	–	1	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	3	–	–	–
14	Scrofulous cachexia	2	3	–	1	2	1	–	–	5	–	–	–	1	1	–	–	–	–	–	–	1	–	–	–	11	5	–	1
15	Rachitis	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–
16	Articular rheumatism, acute	9	–	–	–	3	–	–	–	7	–	–	–	3	1	–	–	12	–	–	–	10	–	–	–	44	1	–	–
17	Articular rheumatism, chronic	1	–	–	–	1	–	1	–	–	–	–	–	2	–	–	–	5	–	1	–	7	2	–	–	16	2	2	–
18	Pleurodynia	7	–	–	–	11	–	–	–	6	–	–	–	6	–	–	–	4	–	–	–	2	–	–	–	36	–	–	–
19	Rheumatalgia	–	–	–	–	1	–	–	–	1	–	–	–	3	1	–	1	1	–	–	–	3	2	–	–	9	3	–	1
20	Lumbago	–	–	–	–	4	–	–	–	2	–	–	–	8	–	–	–	1	–	–	–	1	–	–	–	16	–	–	–
21	Encephalitis	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–
22	Meningitis	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2	–	2	–	1	–	1	–	3	–	3	–
23	Apoplexy	2	–	2	–	5	3	3	3	3	1	3	1	3	–	3	–	10	1	5	1	5	3	3	1	28	8	19	6
24	Eclampsia	–	–	–	–	–	1	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	1
25	Hypochondriasis	–	–	–	–	–	–	–	–	–	–	–	–	2	–	–	–	2	–	–	–	3	–	–	–	7	–	–	–
26	Delirium tremens	2	–	–	–	1	–	–	–	3	–	–	–	7	–	–	–	5	–	–	–	2	–	–	–	20	–	–	–
27	Myelitis	1	1	–	1	1	–	–	–	1	–	1	–	–	–	–	–	2	–	1	–	1	–	–	–	6	1	2	1
28	Spinal meningitis	–	–	–	–	2	–	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2	–	2	–
29	Tic doloreux	–	–	–	–	2	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	2	1	–	–
30	Cephalalgia	1	–	–	–	4	–	–	–	4	2	–	–	1	–	–	–	–	–	–	–	–	–	–	–	10	2	–	–
31	Sciatica	2	–	–	–	1	–	–	–	2	–	–	–	1	–	–	–	3	–	–	–	3	–	–	–	12	–	–	–
32	Paralysis	–	–	–	–	1	–	–	–	1	–	–	–	–	–	–	–	1	–	–	–	–	1	–	1	3	1	–	1
33	Hemiplegia	4	–	1	–	3	–	–	–	2	1	–	–	–	1	–	–	–	–	–	–	1	1	–	1	10	3	1	1
34	Paraplegia	1	–	–	–	1	–	1	–	–	–	–	–	1	1	–	1	–	–	–	–	–	–	–	–	3	1	1	1
35	Epilepsia	3	–	1	–	2	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	3	–	–	–	9	–	1	–
36	Dementia	1	–	–	–	–	–	–	–	1	–	–	–	2	–	–	–	–	–	–	–	–	–	–	–	4	–	–	–
37	Chorea	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	1	–	–	–
38	Hysteria	–	1	–	–	–	–	–	–	–	2	–	–	–	1	–	–	–	1	–	–	–	–	–	–	–	5	–	–
39	Structural disease of the heart	10	–	8	–	9	–	7	–	7	1	5	1	11	–	6	–	10	1	4	–	8	4	5	3	55	6	35	4
40	Endocarditis	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	1	–	–	–
41	Phlebitis	–	–	–	–	–	–	–	–	–	–	–	–	2	–	1	–	1	–	–	–	–	–	–	–	3	–	1	–
42	Laryngitis	1	–	–	–	4	–	–	–	1	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	7	–	–	–
43	Bronchitis	32	–	–	–	37	–	–	–	29	1	–	–	59	–	1	–	31	–	–	–	32	–	–	–	220	1	1	–
44	„ chronic	3	–	–	–	7	1	2	–	2	–	–	–	3	–	1	–	3	–	–	–	3	–	2	–	21	1	5	–
45	„ capillaris	1	–	–	–	2	–	2	–	–	–	–	–	2	–	1	–	2	–	1	–	4	–	2	–	11	–	6	–
46	„ senilis	2	1	1	–	3	–	2	–	3	–	3	–	3	–	3	–	1	1	–	–	–	–	–	–	12	2	9	–
47	Asthma	3	–	–	–	7	–	1	–	3	–	1	–	3	–	–	–	1	–	–	–	4	–	1	–	21	–	3	–
48	Pneumonitis	9	1	4	1	23	–	10	–	13	2	2	1	15	1	1	–	9	–	1	–	11	1	3	–	80	5	21	2
49	Hæmoptysis	–	–	–	–	1	–	–	–	4	–	–	–	2	–	–	–	2	–	–	–	1	–	–	–	10	–	–	–
50	Phthisis pulmonalis	10	–	8	–	14	2	8	1	9	1	3	–	16	–	7	–	10	–	7	–	15	3	6	1	74	6	39	2
51	Pleuritis	7	–	–	–	3	–	–	–	5	–	–	–	5	–	–	–	2	–	–	–	8	2	–	–	30	2	–	–
52	Empyema	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	2	–	–	–	–	–	–	–	3	–	–	–
53	Stomatitis mercurialis	–	–	–	–	1	–	–	–	–	–	–	–	8	–	–	–	1	1	1	–	7	–	–	–	17	1	1	–
54	Tonsillitis	3	–	–	–	10	–	–	–	11	–	–	–	5	–	–	–	2	–	–	–	2	–	–	–	33	–	–	–
55	Parotitis	1	–	1	–	–	–	–	–	1	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	3	–	1	–
56	Gastritis	2	–	1	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	3	–	1	–
57	Indigestion	98	2	–	–	47	1	–	–	51	1	–	–	56	3	–	–	30	–	–	–	90	7	–	–	372	14	–	–
58	Dyspepsia	–	–	–	–	1	–	–	–	–	–	–	–	2	–	–	–	1	–	–	–	–	–	–	–	4	–	–	–
59	Gastralgia	10	–	–	–	3	–	–	–	2	–	–	–	3	–	–	–	2	–	–	–	1	–	–	–	21	–	–	–
60	„ chronica	1	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2	–	–	–
61	Hæmatemesis	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–
62	Enteritis	1	–	1	–	5	–	2	–	–	–	–	–	2	–	–	–	–	–	–	–	–	–	–	–	8	–	3	–
63	Diarrhœa	15	2	4	–	13	–	–	–	7	3	1	–	2	1	–	–	8	–	1	–	4	3	1	1	49	9	7	1
64	„ chronica	–	–	–	–	1	–	1	–	–	–	–	–	1	–	1	–	2	–	2	–	1	2	1	1	5	2	5	1
65	Dysenteria	3	1	–	1	6	–	–	–	3	–	1	–	2	–	–	–	5	–	–	–	6	–	2	–	25	1	3	1
66	„ chronica	–	–	–	–	–	–	–	–	–	–	–	–	1	–	1	–	–	–	–	–	–	–	–	–	1	–	1	–
67	Melæna	–	–	–	–	1	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	2	–	–	–
68	Colica	1	–	–	–	2	–	–	–	6	–	–	–	2	–	–	–	9	–	–	–	4	–	–	–	24	–	–	–
69	Tympanitis	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	1	–	–	–
70	Piles	2	–	–	–	2	–	–	–	3	1	–	–	5	–	–	–	11	–	–	–	9	–	–	–	32	1	–	–
71	Tabes mesenterica	1	–	–	–	8	–	7	–	2	3	2	2	1	–	1	–	1	–	–	–	–	1	–	1	13	4	10	3
72	Intus-susception	–	–	–	–	–	–	–	–	–	–	–	–	1	–	1	–	–	–	–	–	–	1	–	1	1	1	1	1
73	Worms	–	–	–	–	1	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2	–	–	–
74	European cholera	3	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	3	–	–	–
75	Jaundice	–	–	–	–	–	–	–	–	2	–	–	–	–	–	–	–	1	–	–	–	1	–	–	–	4	–	–	–

Statistics of the Civil Hospital in Corfu—*continued.*

—	Detail of the Diseases.	1855.				1856.				1857.				1858.				1859.				1860.				Total.			
		Admissions.		Deaths.		Admissions.		Deaths.		Admissions.		Deaths.		Admissions.		Deaths.		Admissions.		Deaths.		Admissions.		Deaths.		Admissions.		Deaths.	
		Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.
76	Hepatitis	3	–	–	–	4	–	1	–	4	1	–	–	3	–	–	–	1	–	–	–	5	–	–	–	20	1	1	–
77	Biliary concretions	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	1	–	–	–
78	Enlargement of the spleen	–	–	–	–	1	1	–	–	1	1	–	1	1	–	–	–	2	–	–	–	–	–	–	–	5	2	–	1
79	Enlargement of the liver and spleen	–	–	–	–	1	–	–	–	3	1	–	–	4	–	–	–	1	–	–	–	2	1	1	–	11	2	1	–
80	Peritonitis	–	–	–	–	2	–	1	–	–	–	–	–	–	–	–	–	2	1	1	–	1	1	1	–	5	2	3	–
81	Ascites	2	1	1	–	1	1	1	–	4	1	2	1	–	2	–	1	2	1	1	1	3	–	3	–	12	6	8	3
82	Anasarca	1	–	–	–	2	2	–	–	1	–	–	–	1	–	–	–	–	–	–	–	4	–	1	–	9	2	1	–
83	Nephritis	1	–	–	–	–	–	–	–	1	–	–	–	2	–	–	–	–	–	–	–	–	–	–	–	4	–	–	–
84	Renal calculi	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–
85	Bright's disease	–	–	–	–	–	–	–	–	1	–	1	–	1	–	1	–	–	–	–	–	–	–	–	–	2	–	2	–
86	Albuminuria	–	–	–	–	–	–	–	–	1	–	1	–	–	–	–	–	–	–	–	–	–	1	–	–	1	1	1	–
87	Hæmaturia	–	–	–	–	–	–	–	–	1	–	–	–	2	–	–	–	–	–	–	–	–	–	–	–	3	–	–	–
88	Diabetes mellitus	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	1	–	–	–	–	–	1	–	1	–
89	Enuresis	–	–	–	–	–	–	–	–	1	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	1	–	–
90	Dysmenorrhœa	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	1	–	–
91	Metritis	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2	–	–	–	3	–	–
92	Cancer of uterus	–	3	–	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	3	–	2
93	Strumous ophthalmia	–	–	–	–	–	–	–	–	–	2	–	–	–	1	–	–	2	–	–	–	–	–	–	–	2	3	–	–
94	Otitis externa	2	–	–	–	–	–	–	–	1	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	4	–	–	–
95	„ interna	1	–	–	–	2	–	–	–	1	–	–	–	1	–	–	–	–	–	–	–	1	–	–	–	6	–	–	–
96	Urticaria	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	1	–	–	–	1	1	–	–
97	Phtiriasis	–	–	–	–	1	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2	–	–	–
98	Ecthyma	–	–	–	–	1	–	–	–	–	–	–	–	7	–	–	–	2	–	–	–	4	–	–	–	14	–	–	–
99	Zoster	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–
100	Herpes	1	–	–	–	–	1	–	–	1	–	–	–	1	–	–	–	–	–	–	–	–	1	–	–	3	2	–	–
101	Lepra	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	1	–	–	–
102	Scabies	–	–	–	–	1	–	–	–	1	–	–	–	2	–	–	–	1	–	–	–	–	1	–	–	5	1	–	–
103	Pemphigus	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–
104	Rupia	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	1	–	–	–	–	–	–	–	2	–	–	–
105	Syphilitic eruptions	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	1	–	–	–	2	1	–	–
106	Tinea capitis	–	–	–	–	2	–	–	–	1	–	–	–	3	1	–	–	–	–	–	–	2	–	–	–	8	1	–	–
107	Podagra	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	1	–	–	–
108	Pregnancy	–	1	–	–	–	3	–	–	–	6	–	–	–	1	–	–	–	1	–	–	–	6	–	–	–	18	–	–
109	Tetanus traumaticus	–	–	–	–	1	–	1	–	1	–	1	–	–	–	–	–	–	–	–	–	1	–	–	–	3	–	2	–
110	Abscess, acute	10	–	–	–	15	–	1	–	6	1	–	–	10	–	–	–	7	1	1	–	13	–	–	–	61	2	2	–
111	„ chronic	5	1	1	–	3	–	1	–	–	–	–	–	3	–	1	–	2	1	1	1	2	1	1	–	15	3	5	1
112	Diffused phlegmon	–	–	–	–	1	–	–	–	1	–	–	–	1	–	–	–	–	1	–	1	–	–	–	–	3	1	–	1
113	Erysipelatous phlegmon	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–
114	Ulcers	10	1	–	–	13	2	1	–	12	–	1	–	3	–	–	–	16	2	1	–	9	1	–	–	63	6	3	–
115	„ gangrenous	–	1	–	1	1	–	1	–	–	–	–	–	–	–	–	–	1	–	1	–	1	–	–	–	3	1	2	1
116	Humid gangrene	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	1	1	–	–	–	2	–	1	–	3	1	1	1
117	Dry „	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	1	–	–	–	–	–	1	–	1	–
118	Fibrous tumours	–	–	–	–	–	–	–	–	–	–	–	–	1	–	1	–	–	–	–	–	–	–	–	–	1	–	1	–
119	Glandular tumours	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	2	–	–	–	1	–	–	–	4	–	–	–
120	Cystic tumours	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–
121	Exostose	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	1	–	–	–
122	Epithelioma	–	–	–	–	–	–	–	–	1	–	–	–	2	–	–	–	–	–	–	–	1	–	–	–	4	–	–	–
123	Cancer	1	–	1	–	1	–	–	–	4	–	1	–	1	–	–	–	–	–	–	–	–	–	–	–	7	–	2	–
124	Punctured wounds	2	–	–	–	2	–	–	–	6	–	1	–	3	–	–	–	2	–	–	–	4	–	–	–	19	–	1	–
125	Contusions	7	1	–	–	16	–	–	–	8	–	–	–	6	–	–	–	18	–	–	–	24	–	1	–	79	1	1	–
126	Gun-shot wounds	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	2	–	–	–	–	–	–	–	3	–	–	–
127	Burns	–	–	–	–	1	–	–	–	1	–	–	–	1	–	–	–	1	–	–	–	–	–	–	–	4	–	–	–
128	Gonorrhœa	8	8	–	–	11	11	–	–	14	17	–	–	5	22	–	–	7	26	–	–	9	2	–	–	54	86	–	–
129	Syphilitic primary ulcers	20	24	–	–	19	21	–	–	12	14	–	–	22	30	–	–	8	22	–	–	7	26	–	–	88	137	–	–
130	Syphilitic vegetations	–	1	–	–	3	1	–	–	–	–	–	–	–	5	–	–	3	26	–	–	–	18	–	–	6	51	–	–
131	Condylomata	1	–	–	–	1	1	–	–	7	3	–	–	2	1	–	–	2	–	–	–	2	2	–	–	15	7	–	–
132	Bubos	3	–	–	–	4	1	–	–	4	2	–	–	8	2	–	–	4	1	–	–	10	–	–	–	33	6	–	–
133	Secondary syphilis	6	2	–	–	4	2	–	–	18	–	–	–	6	1	–	–	11	1	–	–	7	1	1	–	52	7	1	–
134	Tertiary „	–	–	–	–	1	–	–	–	1	–	–	–	1	–	–	–	1	–	–	–	1	–	–	–	5	–	–	–
135	Caries of bones of the hands	–	–	–	–	1	–	1	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	2	–	1	–
136	Caries of the ribs	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	1	–	–	–	–	–	2	–	1	–
137	Fractures of skull	–	–	–	–	–	–	–	–	–	–	–	–	1	–	1	–	–	–	–	–	–	–	–	–	1	–	1	–
138	„ humerus	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	1	–	–	–	2	–	–	–
139	„ radius	–	–	–	–	1	1	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	2	1	–	–
140	„ phalanges of the hands	–	–	–	–	1	–	–	–	3	–	–	–	2	–	–	–	–	–	–	–	–	–	–	–	6	–	–	–
141	Fractures of ribs	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	1	–	–	–
142	„ femur	–	–	–	–	2	–	–	–	–	–	–	–	2	2	–	–	–	–	–	–	1	–	–	–	5	2	–	–
143	„ tibia	–	–	–	–	1	–	–	–	1	–	–	–	1	–	–	–	4	–	–	–	–	–	–	–	7	–	–	–
144	„ fibula	1	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	3	–	–	–
145	Diseases of joints	3	–	–	–	2	–	–	–	1	–	–	–	4	–	1	–	–	–	–	–	3	–	–	–	13	–	1	–
146	Coxalgia	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–
147	Luxations of humerus	1	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	1	–	–	–	4	–	–	–
148	Luxations of femur	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–
149	Strain of the foot	3	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	5	–	–	–
150	Strain of the hand	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–
151	Wounds of arteries	–	–	–	–	1	–	–	–	–	–	–	–	2	–	2	–	–	–	–	–	1	–	–	–	4	–	2	–
152	Diseases of the eye	5	–	–	–	5	–	–	–	4	1	–	–	4	1	–	–	1	–	–	–	9	1	–	–	28	3	–	–
153	Injuries of the throat	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–

Statistics of the Civil Hospital in Corfu—*continued.*

—	Detail of the Diseases.	1855.				1856.				1857.				1858.				1859.				1860.				Total.			
		Admissions.		Deaths.		Admissions.		Deaths.		Admissions.		Deaths.		Admissions.		Deaths.		Admissions.		Deaths.		Admissions.		Deaths.		Admissions.		Deaths.	
		Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.
154	Injuries of the thorax	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–
155	Hernia, strangulated	2	–	1	–	4	–	–	–	2	1	1	–	–	–	–	–	2	–	1	–	–	–	–	–	10	1	3	–
156	Bubonocele - -	–	–	–	–	–	–	–	–	2	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	3	–	–	–
157	Enterocele - -	–	–	–	–	4	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	5	–	–	–
158	Diseases of rectum -	–	–	–	–	2	–	–	–	–	–	–	–	2	–	–	–	2	–	–	–	6	–	–	–	12	–	–	–
159	„ urinary organs - -	1	–	–	–	2	–	1	–	1	–	–	–	2	–	1	–	1	5	–	–	6	1	1	–	13	6	3	–
160	Strictures of the urethra	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	3	–	1	–	2	–	1	–	6	–	2	–
161	Diseases of genital organs - -	6	–	–	–	6	–	–	–	7	–	–	–	9	–	–	–	8	–	–	–	3	–	–	–	39	–	–	–
162	Diseases of breast -	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	1	–	1	–	1	–
163	Excoriations - -	–	–	–	–	–	–	–	–	–	–	–	–	2	–	–	–	1	–	–	–	–	–	–	–	3	–	–	–
164	Diseases of female genital organs -	–	4	–	–	–	1	–	–	–	2	–	–	–	4	–	–	–	29	–	–	–	37	–	–	–	77	–	–
165	Anthrax - - -	2	–	–	–	–	–	–	–	1	1	–	–	–	–	–	–	–	–	–	–	2	–	–	–	5	1	–	–
166	Boils - - -	1	–	–	–	1	–	–	–	1	–	–	–	1	–	–	–	3	–	–	–	2	–	–	–	9	–	–	–
	Total - -	449	69	39	9	488	68	63	6	426	82	36	7	472	87	39	4	383	125	41	4	512	141	44	11	2,730	572	262	41

Dr. C. LAURANO,
Physician and Surgeon of the Civil Hospital.

No. 4.

Dalla Commissione Centrale Medica,
Corfù, li 27 Settembre 1860.

ONOREVOLE SIGNORE,

LA Commissione Centrale Sanitaria, estraordinariamente adunata si li 17 corrente, fece lettura dell' istanza avvanzata da varj abitanti del Borgo di Manduchio all' Onorevole Direttore Generale di Sanità sulla pessima condizione de conduttori e necessarj, e da ciò le numerose malattie miasmatiche che infestano quel Borgo. Oltrecciò, presero conoscenza dell' esposizione fatta dal protomedico, e dal suo assistente, su tale argamento, rimessa alla sullodata autorità sanitaria, nonchè le misure da essi proposte. Infine, essa veniva informata dallo stesso presidente che tale istanza rimessa a sua Eccellenza il Lord Alto Commissionario questi degnavasi di gettarvi sguardo benigno e si è data premura di rimetterla alla Commissione Medica con raccomandazione onde fosse presa in matura considerazione come pure si occupasse d'investigare sulla condizione di tutti i conduttori della città, e de' sobborghi, e fare su ciò il rapporto scientifico, relativo al caso, allo scopo che il governo passa, in conoscenza di causa, procedere a qualche spesa, onde riorganizzare il lavoro in questione, e togliere i pessimi effetti che traggono sorgente dal attuale sistema.

La Commissione Medica prese ad esaminare l' importante questione la quale richiede al certo i provedimenti del Governo, assoggetta all' Eccellenza sua, per mezzo del suo preside quanto segue.

Che tutti i conduttori, in generale, si della città che de' Borghi di Manduchio, Castrades, e Molino a vento deffettano nella loro costruzione, percui rendono l'atmosfera al sommo grado morbifera.

Che i principali diffetti di questi consistono, in quanto che giacciono superficiali. Non hanno sufficente declive; sboccano vicinissimi alla spiaggia, e le aperture che attrovansi ad intervalli alla parte superiore de' conduttori sono per lo più scoperti, od hanno i coperchi infranti ciòchè dà più facilmente luogo alla libera esalazione de' miasmi. Oltreciò, la Commissione Medica osserva che i necessarii mancano da più abitazioni. Che la pessima costruzione, e disposizione degli attuali, non in libera comunicozione co' pubblici conduttori sotterranei, costituiscono una causa ancora, che influisce sullo stato morbifero dell' atmosfera.

E fatto incontrastabile che la costruzione de' pubblici conduttori e necessarj, la disposizione de' medesimi, nonchè il modo col quale vengono ripuliti, constituiscono importante argomento sotto l'aspetto di pubblica igiene. Oltre l' incomodo che accagiona il puzzo de' conduttori, male costrutti, i pericoli a' quali sono esposti gli abitanti della città e dei sobborghi, e le malattie miasmatiche e generalmente quelle di carattere pestilenziale sono si generalmente conosciute che riesce inutile di qui esporli.

Di pari guisa, con cui il medico pratico cura da malattia gl' individui così al medico pubblico è devoluto il conoscere, e togliere, tra le varie cause, questa di cui fassi cenno, e dalla quale possono risultare diverse malattie epidimiche.

Volendosi quindi allontanare e prevenire i perniziosi effetti risultanti dalla cattiva costruzione de' conduttori, è uopo impedire la genesi de' miasmi, le esalazioni che impregnano l' aria, ed il contaggio dell' atmosfera.

Uopo non vi ha di teorici saggi onde comprovare il vero della quistione, allorquando la quotidiana esperienza chiaramente dimostra che le immondizie in generale nella stagione estiva in cui vi annidano quantità d' insetti giungono al massimo grado di putridine, causa essenziale dello stato morbifero dell' atmosfera.

Al certo le misure principali da adottarsi circa il sistema de' conduttori sotteranei e necessari, col più felice succcsso, per conciliare la mondezza e l' igiene della città e sobborghi sono.

1°. Che niuna via vadi priva di conduttore sotterraneo.

2°. Che i conduttori abbiano il maggior dedivio possibile, onde facilitare il corso delle immondizie e delle acque, e lo sbocco di queste sul mare.

3°. Che i conduttori siano di forma cilindrica, od ovale, e costrutti in modo da offerire una base concava e sufficientemente larga onde non dia adito alle immondizie ed alle acque di stazionare, e putrefarsi, e rinnovare il contaggio, ma che neppure possino queste, facilmente trascinate, internarsi nelle pareti de medesimi.

4°. Che i conduttori sieno muniti nella parte superiore, di aperture a distanze onde servino di ricevitori de' piccoli conduttori confluenti i quali vi conducono la pioggia ed i ghioccioni delle case in generale, e

servino d' introduzione agli operaj i quali dovranno accomodare, o pulire siffatti conduttori. Che le aperture suddette sieno garantite da coperchi di pietra o da inferriate.

5to. Che una corrente d' acqua in grande quantità, scorra colla massima precipitazione, in tempo di siccità, per entro i conduttori stessi e per siffatto modo si puliscano, e vadino mondi di morbifere esalazioni.

6to. Che i conduttori, giaccino sufficientemente sotterra onde non sieno danneggiati e guasti dal passaggio delle carrozze, e per l' analoga profondità non mandino sgradevole odore o malsane esalazioni.

7mo. Che l' uscite de conduttori in mare non si effettuino semplicemente nella spiaggia, ma che sbocchino a certa profondità, e ad una distanza analoga di modochè le acque possano trascinare le immondizie, e non tramandare malsane esalazioni.

Accurata sorveglianza dovrebbesi ingiungere nell' accomodare o pulire i conduttori come pure adottare misure per impedire il propagarsi d' infette esalazioni come p. e. sarebbe il non permettere la pulitura durante l' estate e le giornate calde e molto meno durante il giorno.

I pericoli, risultanti dalle corrotte esalazioni, emananti da necessarii, e le misure preventive da doversi adottare onde evitarli, costituisce argomento di molta importanza, ed uno de principali della polizia medica che concerni la purezza dell' aria, e questi richiedono del pari la considerazione del Governo.

Poichè, ammesso che i pubblici conduttori sotterranei sieno pulitissimi e per loro costruzione scevri da qualsivoglia esalazione malsana, se nelle abitazioni particolari v' ha la fonte dell' infezione, l' atmosfera sarà egualmente malsana e perniziosa, per il che ogni abitazione dovrebbe andare fornita di relativo necessario, in libera comunicazione co' pubblici conduttori sotterranei, e la mondezza de' medesimi sia sorvegliata onde non rendi l' abitazione stessa malsana e sgradevole.

Ma oltreciò, le vie devono essere pulite di frequente, ne sia permesso l' accumularsi di immondizie, e il getto dalle case.

I canaletti ai latti delle vie, devono pure apparire mondi da tutto ciò che può impedire il libero corso delle acque, e quindi, devono essere spazzati e giornalmente lavati.

Osservasi però che siccome gli abitanti non attrovansi sempre in situazione propria per dare corso a loro bisogni, è necessario che misure relative siano prese onde conciliare il comodo de' cittadini colla mondezza della città e de' sobborghi col stabilire in luoghi appositi lattrine o pubblici ricevitoj costrutti in modo che non tramandino esalazioni.

Tali sono i principii che la Commissione Medica raccomanda circa il sistema de' conduttori sotterranei e necessarj il quale molto concorre alla mondezza e l' igiene della città e de' sobborghi.

Però, forse l' effettuare di un tale piano, su di basi tali, richiede non picciol dispendio, percui in primo luogo questo lavoro devesi maturamente ponderare, ed in secondo, l'esecuzione del piano suesposto doversi affidare ad esperto ingegnere, colla cooperazione di una Commissione Medica.

Di più, oltre il suddetto lavoro richiedonsi pure alcuni regolamenti quali possono concorrere a mantenere il sistema, e pel conseguimento de' buoni risultati di questo rame di pubblica igiene.

La Commissione Medica arguisce nell' atto che a misure urgenti dovrassi procedere, riguardo il sobborgo di Manduchio, crede che saggiamente l'Onorevole Presidente ordinava l'appertura de' sbocchi de' conduttori sotterranei e la chiusura de spiragli, mediante coperti di ferro oltrociò sarebbe necessario di emanare ordini relativi, perchè le pubbliche vie di Manduchio siano spazzate almeno una volta per settimana dopo che le imminenti pioggie verranno al certo porre un termine alle malattie che infestano quel sobborgo, e ciò per ora, per l' avvenire poi che il Governo voglia adottare sul proposito misure più radicali a norma delle basi suaccennate.

E. F. Barr,
Presidente della Commission Medica Centrale.

All' Onorevole Signore,
Il Signor E. F. Barr,
F. f. di Segretario di S.E. il L.A.C.,
&c. &c. &c.
Corfu.

Vera traduzione rilasciata per ordine del Presidente,
Officio Centrale della Commissione,
Corfù, 30 Ottobre 1861,
Nico. Rodili, Segretario.

No. 5.

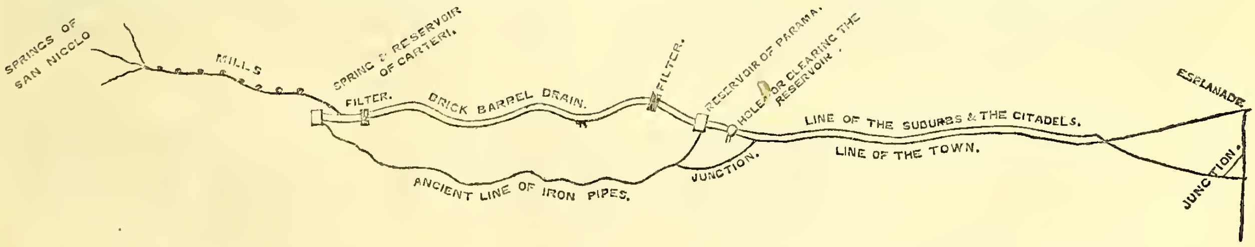
Memorandum of Water Supply requested by the Sanitary Commissioners.

The supply of water for the town of Corfu, the suburbs, and the citadels, is derived from the spring of Carteri and from those of San Nicolo, upon Binosoa, at seven miles distance from the town (1).

The water of Carteri is clear and abundant at every season, but it contains many salts in solution, and is not sufficiently aired. It issues in a small reservoir, from which it enters in two different lines.

One of these lines is a brick barrel drain of two feet diameter, and the other an ancient one of iron pipes, which having been abandoned since the construction of the barrel drain, was lately put again in activity.

The water of San Nicolo issues in many places at a little distance the one from the other, clear and fresh at its source, it becomes, in spite of all care, considerably dirtied by passing through eight mills, before its arrival near the reservoir of Carteri, where it falls into the above-mentioned brick barrel drain.


SPRINGS OF SAN NICCLO
MILLS
SPRING & RESERVOIR OF CARTERI.
FILTER.
BRICK BARREL DRAIN.
FILTER.
RESERVOIR OF PARAMA.
HOLE FOR CLEARING THE RESERVOIR.
ESPLANADE.
LINE OF THE SUBURBS & THE CITADELS.
LINE OF THE TOWN.
JUNCTION.
ANCIENT LINE OF IRON PIPES.
JUNCTION.

The water supplied by this drain passes through two filters, the one situated near the reservoir of Carteri, the other near the reservoir of Peramo and before it, in order to stop the substances which are in suspension in the water, and to diminish as much as possible the incrustations formed in the iron pipes. Thence it falls into the reservoir of Peramo, in which falls also the water carried by the above said line of iron pipes.

The water so collected in this reservoir is led to the entrance of the town by two lines of iron pipes of nine inches diameter, one for the town and the other for the citadels and the suburbs.

These two separated lines can by their branches be joined at every occasion near the esplanade, and the line of the town being also united near the reservoir of Peramo to the iron line, which from Carteri leads the water to this reservoir, the water can be led from the springs into the town, the suburbs, and the citadels by two different lines, one of which is independent of the reservoir of Peramo ; consequently

every inconvenience in the supply of water can be prevented.

Finally, branches of iron pipes of four, three, and two inches diameter lead the water to the principal points, and partial lead pipes, three-quarter inches diameter, furnish it to the consumers by 1,382 cocks, divided as follows :—

Line of the Town.		
For public fountains - -	29	
For private houses, shops, and public establishments -	1,096	
For gardens - - - -	5	
		1,130
Line of the Suburbs.		
For public fountains - -	13	
For private houses, shops, and public establishments -	133	
For gardens - - -	6	
For the citadels - -	100	
		252
Total - - -		1,382

The volume furnished by this number of cocks is very variable in the different seasons, at every day of the week, and on different hours of the day, but at middle term we can take the volume of 324,250 gallons per day, and from that volume the citadels receive about 50,400 gallons per day.

Such a quantity of water is furnished from the spring of Carteri alone during eight months in the year, and consequently at that time the water of San Nicolo is not employed, especially on account of its dirtiness.

During the other four months, to the water of Carteri is added that of San Nicolo, of which every care is taken to render it as clear as possible ; and sometimes, when the rains are scarce, that period is still prolonged, and all the waters of Carteri and San Nicolo united together are not sufficient to make the above-mentioned volume, in order to satisfy all the enormous exigencies of the inhabitants and the waste of water they make day and night.

However, we must observe that during the above-said eight months the supplied quantity of water could be increased if, besides the usual distribution, the exceeding water, which runs uselessly at Peramo and Carteri, was employed to fill the cisterns and reservoirs of the citadel as well as those of the town, which stand in need of repair, and which would offer a great advantage if they were put in activity under the power of the Aqueduct Commission.

In the other four months the supplied quantity of water would be also increased, especially for the citadels, whose line, although of nine inches diameter, as that of the town, and lately in great part renewed and cleaned from the ancient incrustations, supplies the water only to 252 cocks. The water would be better in quality if the eight mills existing at San Nicolo were destroyed.

That being done, the volume of water now supplied by the different springs of San Nicolo would be easily increased on making some excavation ; and after having collected this water at a reservoir, it could be carried regularly in a barrel drain to Carteri without sustaining any loss, and its good qualities would be preserved.

These works concerning the cisterns of the town and the spring of San Nicolo are of the first necessity. At the same time, the completing of the filter lately constructed at Peramo, the renewing of many parts of the existing barrel drain, from which, in spite of all repair, the water runs uselessly, some measures for the distribution of water in the town, the covering of the reservoirs of Carteri and Peramo, and the junction of this last reservoir with the line of the suburbs, are works required in order to obviate every inconvenience, and to put that aqueduct in such a degree of perfection as will make it rival the aqueducts of the principal towns of the world, not only for the quantity of the supplied water, but also for its good qualities.

(Signed) B. Pieri Lahihiopulo.

Corfu, Nov. 25, 1861.

True copy,
J. K. Kane, Clerk, 2d class,
Royal Engineer Department.

Chemical Department,
Royal Arsenal, Woolwich, S.E.,
July 4, 1862.

Memorandum for the Inspector-General of Fortifications, with reference to samples of water forwarded for analysis by the Commanding Royal Engineer at Corfu, in accordance with a recommendation contained in a Report made by the Chemist of the War Department, on samples of water from Corfu in March 1861.

These samples were received on the 27th August 1861 and the 10th April 1862. The results of analysis of the samples first received could not be reported upon until the whole series had been examined.

The four samples were contained in stoppered glass bottles completely filled, as recommended in my Report of March 5th 1861.

The results of their analyses fully confirm the conclusion to which I was led by the examination of the first series of samples, which were sent from Corfu in earthenware jars, and were reported upon in March 1861. Those jars, in consequence of their very porous nature, and of their containing free lime in their composition, had produced a change in the composition of the waters which they contained, resulting in the almost complete removal of carbonate of lime from them. Hence, their analysis afforded no explanation of the formation of considerable deposits of carbonate of lime in the service pipes at Corfu.

The four samples which form the subject of the present report have, however, furnished analytical results which readily account for the production of those deposits in the pipes which led to the present inquiry.

The following are the principal solid constituents contained in the four samples of water, calculated upon the imperial gallon :—

——	I. San Nicolo Water taken at its Source, at the Junction of all the small Springs.	II. San Nicolo Water, after its Passage through Eight Miles.	III. Water of the Spring of Carteri.	IV. Water of the united Springs of Carteri and San Nicolo, in the State it falls into the Reservoir of Parama.
	grs.	grs.	grs.	grs.
Carbonate of lime - -	12·99	12·60	16·52	14·00
Carbonate of magnesia -	3·02	2·20	1·79	1·53
Sulphate of lime - -	6·85	6·66	13·33	8·96
Sulphate of magnesia - -	3·68	2·85	8·39	6·80
Chloride of sodium - -	1·37	1·25	1·99	1·48
Oxide of iron and alumina -	0·42	0·30	—	trace.
Organic matter - -	2·24	2·00	2·38	1·80
Total solid constitutents (direct estimation) - - -	30·58	29·96	44·40	34·80

It appears from the above results that:—(1.) the "San Nicolo" water contains a considerable proportion of carbonate of lime, besides a small quantity of carbonate of magnesia. The sulphates of lime and magnesia are also present in proportions sufficiently great to add considerably to the hardness of the water.

(2.) The passage of the "San Nicolo" water through eight mills, and the considerable amount of agitation to which it must thus be subjected, does not have the effect of reducing to any important extent the proportion of earthy carbonates in the water. There is no doubt, however, that the subsequent deposition of these carbonates from the water is greatly promoted by its passage through the mills, as the free carbonic acid gas originally contained in the water must be expelled thereby to a considerable extent. For earthy carbonates to remain in solution in water during its passage through great lengths of pipe, and its occasional exposure to air, in tanks and reservoirs, it is essential that the water should contain a decided excess of free carbonic acid gas beyond the proportion necessary to hold the carbonates in solution. If the quantity of gas dissolved is reduced by agitation or exposure of the water to an amount about equal to that which is contained in the carbonates of lime and magnesia themselves, the deposition of these will speedily commence, since any further escape of carbonic acid will deprive the water of the power of holding them in solution.

The *total* amount of carbonic acid gas in some of the San Nicolo water was carefully determined (the material for this purpose being taken from perfectly full and tolerably well-stoppered bottles). The result obtained in this experiment showed that there was only just sufficient free carbonic acid present in the water to keep the carbonates of lime and magnesia in solution. Several bottles containing the San Nicolo water, and of which the stoppers fitted very imperfectly, were found to have become coated on the inside with crystalline deposits of the earthy carbonates originally in solution in the water. The gradual escape of some of the carbonic acid from the water, favoured by the agitation to which the latter had been subjected in its passage to this country, had led to the formation of these deposits, which, therefore, corresponded exactly in their nature and the mode of their production to the incrustations found in the service pipes at Corfu. The deposits in question were more particularly observed in bottles containing the San Nicolo water, collected after its passage through eight mills.

(3.) The water from the spring of Carteri contains more carbonate of lime, and very considerably more earthy sulphates, than the San Nicolo water. It is, indeed, an exceedingly hard water, and one which could be only very partially softened by artificial means.

All the bottles which were filled with this water exhibited crystalline deposits of the earthy carbonates, like those above referred to, which were more or less considerable, according to the degree of tightness with which the stoppers fitted, and the consequent extent to which the free carbonic acid in the water could make its escape during the transmission of the bottles from Corfu.

It will be seen from the above that the continual production of incrustations in the service pipes at Corfu is explained by the great hardness of the waters constituting the supply, and by the facility with which the water deposits a portion of its earthy carbonates when exposed to agitation, such as it must be subjected to in passing through great lengths of pipe.

There is no doubt that the only practicable method which would be effectual in preventing the formation of those incrustations is that of the separation of the earthy carbonates from the water by Clark's softening process. By its application to the supply of water at Corfu, the quality of the latter, as regards hardness, would, of course, also be considerably improved.

I am unaware whether the employment of the liming process, which is in itself a simple and an inexpensive one, would be attended by any great local difficulties, but it is unquestionably the only efficient remedy against the incrustations complained of.

I need scarcely point out that the quality of the Corfu water supply (with special reference to its hardness) would be improved if the water from the Carteri spring were not included in it.

J. A. Abel,
Chemist of the War Department.

No. 6.

Table showing the Total Admissions and Deaths from the principal Diseases occurring among an average Strength of 2,208 British Troops at Corfu and Vido during 10 years from 1st April 1850 to 31st March 1860.

Diseases.	Total in Ten Years.	
	Admissions.	Deaths.
Fevers:		
Intermittent	377	2
Remittent	199	12
Continued	1,999	46
Typhus and Typhoid	54	14
Eruptive	167	5
Cholera	70	36
Diarrhœa	1,503	5
Dysentery	72	3
Hepatic disease	137	3
Rheumatism	804	4
Phthisis	105	41
Other pulmonary diseases	2,365	36
All other diseases	12,938	56
Total	20,790	263

No. 7.

RETURN showing the NUMBER of ADMISSIONS into HOSPITAL and DEATHS a

1. For the 13 Weeks ende

Regiments and Detachments.	Station.	Barracks.	Average Strength.	Parotitis.	Tonsillitis.	Influenza.	Ophthalmia.	Furunculus.	Diarrhœa.	Febris Intermittens.	Febris Remittens.	Febris Typhoides.	Febris Typhus.	Febris Continua.	Anthrax.	Rheumat. Acutus.	Rheumat. Chronicus.	Syphilis Primaria.	Syphilis Secundaria.	Bubo.	Gonorrhœa.	Phymosis, &c.	Orchitis (Gonorrhœal).	Strict. Urethræ.	Lepra.	Ebriositas.	Scabies.	Tænia Solium.	Ascaris Lumbric.	Aphthæ.	Lumbago.	Scrofula.	Morbus Coxarius.	Phthisis Pulmon.	Hæmoptysis.
				CLASS I.—ZYMOTIC DISEASES.																											CLASS II				
				Order 1.—Miasmatic Diseases.														Order 2.								3.	4.					2.			
Royal Artillery and Royal Engineers	Corfu and Vido	Citadel	581	1	4	–	1	–	3	–	–	–	–	3	–	6	–	–	–	2	4	–	–	–	–	–	1	1	–	–	–	–	–	–	1
2d Battalion 2d Regiment	Do.	Do.	867	–	3	–	1	3	4	8	2	–	–	10	1	5	1	3	1	1	5	–	–	–	1	1	–	–	1	–	1	–	1	1	–
2d Battalion 4th Regiment	Do.	Fort Neuf	824	–	6	5	5	1	5	–	–	2	–	12	–	–	3	1	–	3	2	–	–	1	–	2	–	–	–	–	–	1	–	7	–
1st Battalion 9th Regiment	Do.	Citadel	669	–	3	–	9	–	4	–	–	–	1	5	–	2	–	2	1	1	5	–	–	–	–	–	1	–	–	–	–	4	–	–	–
Men of 2d Battalion 9th Regiment attached to above corps.	Do.	Do.	16	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Detachment 2d Battalion 4th Regiment.	Paxo	San Nicolo Fort.	33	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1
Detachments Royal Artillery and 1st Battalion 9th Regiment.	Santa Maura	Fort	115	–	–	–	1	–	–	–	1	–	–	–	–	1	–	–	1	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–
Head-quarters 2d Battalion 9th Regiment.	Cephalonia	Town	514	–	4	–	2	–	2	4	–	–	–	1	–	1	–	4	1	–	10	1	–	1	–	–	–	–		–	–	2	–	–	–
Detachments Royal Artillery and 1st Battalion 9th Regiment.	Ithaca	Town	56	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Detachment Royal Artillery, Left Wing 2d Battalion 9th Regiment.	Zante	Castle and Town.	321	–	2	–	3	–	1	–	–	–	–	2	–	–	–	10	2	1	3	1	1	–	–	2	–	–	–	1	–	–	–	–	1
Detachment 1st Battalion 9th Regiment.	Cerigo	Castle	31	–	–	2	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Total			4,060	1	22	7	23	5	19	12	3	2	1	33	2	15	4	20	7	8	29	2	1	2	1	5	2	1	1	2	1	7	1	8	3

2. For the 13 Weeks ended

Regiments and Detachments.	Station.	Barracks.	Average Strength.	Parotitis.	Tonsillitis.	Ophthalmia.	Erysipelas.	Furunculus.	Dysenteria Chronica.	Diarrhœa.	Phlyctenula.	Febris Intermittens.	Febris Remittens.	Febris Typhoides.	Febris Continua.	Rheumat. Acutus.	Rheumat. Chronicus.	Syphilis Primaria.	Syphilis Secundaria.	Iritis Syphilitica.	Bubo.	Gonorrhœa.	Phymosis, &c.	Orchitis (Gonorrhœal).	Strict. Urethræ.	Scorbutus.	Ebriositas.	Scabies.	Tænia.	Lumbago.	Scrofula.	Phthisis Pulmonalis.	Hæmoptysis.	Tuberculosis.	Delirium Tremens.	Mania.	Epilepsia.	Cephalæa.	Tetanus.	Dysecœa.	Cataract.	Tænia Palpebra.
				CLASS I.—ZYMOTIC DISEASES.																										CLASS II.												
				Order 1.—Miasmatic Diseases.														Order 2.								3.		4.		1.	2.				Order 1.							
Royal Artillery and Engineers.	Corfu and Vido	Citadel	585	2	3	–	–	–	–	–	–	1	–	–	14	6	–	2	1	–	7	5	–	–	–	1	2	–	1	–	–	–	2	–	–	–	–	–	–	–	–	–
2d Battalion 2d Regiment	Do.	Do.	860	–	4	10	2	–	2	11	–	11	20	–	13	6	3	10	–	–	6	10	1	–	–	–	–	–	1	–	–	2	1	–	–	–	–	1	–	–	–	–
2d Battalion 4th Regiment	Do.	Fort Neuf	808	–	2	3	–	2	–	9	–	–	1	1	12	–	–	8	1	1	4	7	–	–	3	–	7	–	–	–	2	1	–	–	–	1	–	–	–	1	1	–
1st Battalion 9th Regiment	Do.	Citadel	674	–	–	9	–	–	–	47	–	3	11	–	20	–	–	8	1	–	2	3	–	3	–	–	4	2	–	–	1	1	3	–	–	–	–	–	–	–	–	–
Men of 2d Battalion 9th Regiment, attached.	Do.	Do.	26	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Detachment 2d Battalion 4th Regiment.	Paxo	San Nicolo Fort.	33	–	–	–	–	–	–	–	–	3	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Detachments Royal Artillery and 1st Battalion 9th Regiment.	Santa Maura	Fort	115	–	–	–	–	1	–	–	–	1	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–
Head-quarters 2d Battalion 9th Regiment, and detachment Royal Artillery.	Cephalonia	Town	532	–	2	20	–	1	–	2	–	1	–	–	4	10	1	3	1	–	–	13	1	1	–	–	–	–	–	–	1	–	–	1	1	–	–	–	–	–	–	1
Detachments Royal Artillery and 1st Battalion 9th Regiment.	Ithaca	Town	55	–	–	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–
Detachments Royal Artillery and 2d Battalion 9th Regiment.	Zante	Castle and Town.	320	–	–	3	–	–	–	–	2	2	–	–	7	1	–	2	–	–	3	5	–	1	–	–	–	–	–	1	–	–	–	–	1	–	–	–	–	–	–	–
Detachment 2d Battalion 4th Regiment.	Cerigo	Castle	32	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Total			4,040	2	11	47	2	4	2	69	2	22	32	1	70	23	4	33	6	1	22	43	2	5	3	1	14	2	2	1	4	4	6	1	2	1	1	1	1	1	1	1

No. 7.

each STATION in the IONIAN ISLANDS, for the first Nine Months of 1861.

Friday the 29th of March 1861.

Class III.—Local Diseases.																																									IV.	Class V.											Fatal Cases.					
Order 1.									2.			Order 3.								Order 4.								5.	6.	7.		Order 8.									4.	Order 1.							6.									
Delirium Tremens.	Mania.	Epilepsia.	Cephalæa.	Obs. pro Cæcitas.	Neuralgia.	Dysecœa.	Obs. pro Del. Trem.	Convulsio.	Angina Pectoris.	Varix.	Morb. Valv. Cordis.	Bronchitis Acuta.	Bronchitis Chronica.	Pleuritis.	Dyspnœa.	Pneumonia.	Asthma.	Catarrh. Acutus.	Pleurodynia.	Enteritis.	Obstipatio.	Dyspepsia.	Colica.	Hæmatemesis.	Hernia Inguin.	Hæmorrhois.	Hæpatitis Chronica.	Eneuresis.	Orchitis (not Gonorrh.)	Contractura.	Necrosis.	Herpes.	Impetigo.	Psoriasis.	Eczema.	Phlegmon.	Abscessus.	Paronychia.	Ulcus.	Hordeolum.	Asthenia et Debilitas.	Ambustio.	Fractura.	Contusio.	Vulnus Incis. et Contus.	Luxatura.	Subluxatio.	Vesiculæ Pedis.	Punitus.	Not yet diagnosed.	Admitted.	Died.	Febris Typhoides.	Febris Continua.	Phthisis Pulmon.	Hæmoptysis.	Pleuritis.	Vulnus Incis.
1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7	-	-	-	2	-	1	-	-	-	1	1	-	-	2	1	-	1	2	1	-	3	1	-	-	-	6	1	1	1	-	-	1	61	2	-	1	-	1	-	-
-	1	-	1	2	1	-	-	1	-	-	-	8	1	1	1	-	1	-	-	-	2	3	2	-	1	1	-	-	-	-	-	1	1	1	2	8	5	1	5	-	1	1	1	6	5	-	8	-	-	-	127	-	-	-	-	-	-	-
-	-	1	-	-	-	1	-	-	-	1	2	2	-	-	-	-	-	-	-	-	-	10	1	-	-	-	1	1	3	1	-	-	-	2	-	17	2	-	12	-	5	-	-	7	1	-	3	-	2	2	133	3	1	2	-	-	-	-
2	-	-	2	-	-	-	1	-	-	-	-	15	-	2	-	-	-	-	-	-	-	4	-	1	-	-	-	-	-	-	1	-	1	-	-	7	4	1	2	-	-	-	-	6	2	-	-	-	1	1	91	5	-	2	1	-	1	1
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-	2	-	-	-	11	-	-	-	-	-	-	-
-	-	-	-	-	-	1	-	-	1	-	-	-	1	-	-	-	-	-	-	-	1	1	-	-	1	1	-	1	-	-	-	2	4	1	2	5	-	-	1	-	-	-	-	5	3	-	5	1	-	-	70	-	-	-	-	-	-	-
-	-	1	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	4	-	-	-	-	-	9	-	-	-	-	-	-	-
-	-	1	1	-	-	-	-	-	-	-	-	4	-	-	-	1	-	-	1	-	-	2	-	-	-	-	-	-	-	-	-	-	-	1	-	3	-	-	1	-	1	-	-	5	5	-	-	-	-	-	56	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-
3	1	3	4	2	1	2	1	1	1	1	2	31	2	3	1	1	2	7	1	2	3	23	3	2	2	2	1	3	4	1	1	5	7	5	5	45	12	3	24	1	7	1	1	36	21	1	19	1	3	4	568	10	1	5	1	1	1	1

Friday the 28th of June 1861.

Class III.—Local Diseases.																																									IV.	Class V.													Fatal Cases.								
2.				Order 3.										Order 4.											5.		6.		7.		Order 8.										4.	Order 1.								6.													
Endocarditis.	Angina Pectoris.	Morb. Val. Aortæ.	Morb. Val. Cordis.	Catarrh.	Bronchitis Acuta.	Bronchitis Chronica.	Pleuritis.	Laryngitis.	Pneumonia.	Polypus Nasi.	Asthma.	Dyspnœa.	Pleurodynia.	Enteritis.	Obstipatio.	Dyspepsia.	Colica.	Hæmatemesis.	Hernia Inguin.	Hernia Humor.	Hæmorrhois.	Fistula in Ano.	Hæpatitis Chronica.	Icterus.	Enuresis.	Morbus Prostaticus.	Hydrocele.	Orchitis (not Gonorrh.)	Contractura.	Periostitis.	Necrosis.	Herpes.	Impetigo.	Psoriasis.	Eczema.	Icthyosis.	Pemphigus.	Phlegmon.	Abscessus.	Paronychia.	Ulcus.	Hordeolum.	Atrophia et Asthenia.	Ambustio.	Explosio.	Fractura.	Contusio.	Vulnus Incis. et Contus.	Luxatura.	Subluxatio.	Vesicula Pedis.	Not yet diagnosed.	Admitted.	Died.	Febris Remittens.	Febris Typhoides.	Febris Continua.	Syphilis Secundaria.	Phthisis Pulmonalis.	Tetanus.	Bronchitis Chronica.	Enteritis.	Submersio.
-	-	-	-	11	-	-	-	-	1	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1	-	-	7	2	1	1	1	-	1	-	1	11	3	-	1	-	2	94	-	-	-	-	-	-	-	-	-	-
-	-	1	2	-	11	3	1	-	-	-	-	2	-	-	1	3	-	1	-	-	1	-	-	-	-	-	-	2	1	1	-	1	-	1	1	-	-	8	-	1	4	-	1	-	-	-	7	3	-	-	-	-	171	1	-	-	-	-	-	-	-	-	1
-	-	-	-	-	-	-	-	1	-	-	-	-	-	1	-	5	1	-	-	-	2	-	1	1	-	-	-	3	-	-	-	2	-	-	-	-	-	6	1	-	2	-	3	-	1	-	6	3	1	4	-	-	111	2	-	1	-	-	-	-	-	1	-
-	-	-	-	-	9	-	-	-	-	-	-	-	-	-	2	3	-	1	-	-	3	1	-	-	-	1	-	-	-	-	-	-	1	-	2	1	-	6	2	-	8	-	-	1	-	-	9	2	-	1	-	-	171	4	1	-	2	1	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	1	-	-	-	-	1	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	2	-	-	7	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	1	1	-	1	-	-	-	-	-	-	1	-	-	-	-	10	1	-	-	-	-	-	1	-	-	-
-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1	1	-	-	-	1	-	-	-	-	-	-	1	-	5	1	-	-	1	-	1	-	13	-	-	-	-	-	4	10	-	6	1	-	112	1	-	-	-	-	-	-	1	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	2	-	-	-	-	-	6	-	-	-	-	-	15	-	-	-	-	-	-	-	-	-	-
1	-	-	-	-	4	-	-	-	1	1	-	-	1	-	-	3	-	-	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	8	2	-	1	-	-	-	-	-	6	6	-	2	-	-	60	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-
1	1	1	2	11	24	3	1	1	2	1	1	2	2	1	4	18	1	4	1	1	6	1	1	3	1	1	1	5	1	1	1	3	7	2	4	1	1	36	9	3	32	1	4	2	1	1	52	28	1	16	1	2	762	10	1	1	2	1	1	1	1	1	1

No. 7.—RETURN showing the NUMBER of ADMISSIONS into HOSPITAL and DEATHS at

3. For the 13 Weeks ended

Regiments and Detachments.	Stations.	Barracks.	Average Strength.	Class I.—Zymotic Diseases.																														II.		
				Order 1.—Miasmatic Diseases.																			Order 2.							3.		4.		Order 2.		
				Parotitis.	Tonsillitis.	Ophthalmia.	Erysipelas.	Furunculus.	Dysent. Acuta.	Dysent. Chronica.	Diarrhoea.	Iritis.	Feb. Intermitt.	Feb. Remittens.	Feb. Typhoides.	Feb. Continua.	Feb. Recurrens.	Anthrax.	Rheum. Acut.	Rheum. Chronic.	Pterygium.	Erythema.	Syphilis Prim.	Syphilis Secund.	Iritis Syphil.	Bubo.	Gonorrhoea.	Orchitis (Gonorrhoeal.)	Strictura Urethræ.	Scorbutus.	Ebriositas,	Tænia Solium.	Vermes.	Scrofula.	Phthisis Pulm.	Hæmoptysis.
Royal Artillery and Engineers -	Corfu and Vido -	Citadel -	558	1	4	1	1	–	–	–	3	1	1	–	–	15	–	–	5	1	–	1	21	6	1	5	8	1	–	1	2	–	1	–	–	–
2d Battalion 2d Regiment - -	Do. - -	Do. - -	878	–	3	6	–	–	–	1	14	–	12	12	1	77	–	1	3	–	–	–	19	1	–	8	20	1	–	–	1	–	1	1	3	1
2d Battalion 4th Regiment - -	Do. - -	Fort Neuf	794	–	6	5	1	2	–	–	22	–	3	–	5	177	–	–	4	–	–	–	7	1	–	4	4	–	1	–	7	–	–	–	4	1
1st Battalion 9th Regiment - -	Do. - -	Citadel -	680	–	–	7	–	1	2	–	45	–	1	7	–	56	–	–	–	–	–	–	11	–	–	2	4	–	–	–	1	–	–	–	–	1
Men of 2d Battalion, 9th Regiment, attached.	Do. - -	Do. - -	22	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Detachment 2d Battalion, 4th Regiment.	Paxo - - -	San Nicolo Fort.	33	–	1	–	–	–	–	–	1	–	8	–	–	10	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–
Detachments Royal Artillery and 1st Battalion 9th Regiment.	Santa Maura -	Fort -	132	–	–	2	–	–	–	–	1	–	4	2	–	1	1	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Head-quarters, 2d Battalion 9th Regiment, and Detachment Royal Artillery.	Cephalonia - -	Town -	552	–	5	16	–	–	–	–	4	–	–	–	–	255	–	–	4	–	–	–	–	–	–	–	6	–	–	–	1	–	–	1	–	–
Detachments Royal Artillery and 1st Battalion 9th Regiment -	Ithaca - - -	Town -	70	–	–	–	–	–	–	–	5	–	–	–	–	4	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–
Detachments Royal Artillery and 2d Battalion 9th Regiment.	Zante - - -	Castle and Town.	317	–	–	1	–	–	–	–	2	–	–	–	–	42	–	–	1	–	1	–	2	3	–	3	4	–	–	–	–	–	–	–	–	–
Detachment 2d Battalion 4th Regiment.	Cerigo - - -	Castle -	32	–	1	–	–	–	–	–	–	–	6	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Total - - -	- - -	- - -	4,068	1	20	38	2	3	2	1	97	1	35	21	6	637	1	1	18	1	1	1	60	12	1	22	46	2	1	1	12	1	2	2	7	3

SUMMARY of RETURNS of ADMISSIONS into HOSPITAL and DEATHS during

Class.	Order.	Average Strength - -	13 Weeks ended 29th March.		13 Weeks ended 28th June.		13 Weeks ended 27th September.		Total in Nine Months.	
			4,060.		4,040.		4,068.			
		Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
	1	Miasmatic diseases - - - -	149	6	291	4	887	12	1,327	22
	2	Enthetic " - - - -	70	—	115	1	144	—	329	1
	3	Dietic " - - - -	5	—	15	—	13	—	33	—
	4	Parasitic " - - - -	6	—	4	—	3	—	13	—
I.		Total Zymotic Diseases - -	230	6	425	5	1,047	12	1,702	23
	1	Diathetic diseases - - - - -	1	—	1	—	—	—	2	—
	2	Tubercular " - - - -	19	2	15	1	12	—	46	3
II.		Total Tubercular Diseases - -	20	2	16	1	12	—	48	3
		Diseases of the—								
	1	Nervous system - - - - -	18	—	9	1	21	—	48	1
	2	Circulatory " - - - - -	4	—	5	—	9	—	18	—
	3	Respiratory " - - - - -	48	1	48	1	54	2	150	4
	4	Digestive " - - - - -	38	—	41	1	67	1	146	2
	5	Urinary " - - - - -	3	—	2	—	—	—	5	—
	6	Reproductive system - - - -	4	—	6	—	5	—	15	—
	7	Locomotive " - - - -	2	—	3	—	8	—	13	—
	8	Integumentary " - - - -	107	—	99	—	149	—	355	—
III.		Total Local Diseases - -	224	1	213	3	313	3	750	7

each STATION in the IONIAN ISLANDS, for the First Nine Months of 1861—*continued.*

Friday the 27th of September 1861.

CLASS III.—LOCAL DISEASES.																																											IV.	CLASS V.												FATAL CASES.					
Order 1.						2.					3.						Order 4.										6.	7.				Order 8.											3.	Order 1.							6.										
Delirium Tremens.	Mania.	Epilepsia.	Cephalæa.	Otitis.	Convulsio.	Pericarditis.	Hypertroph. Cordis.	Aneuris. Aortæ.	Syncope.	Morb. Valv. Cordis.	Bronchitis Acut.	Bronchitis Chronica.	Pleuritis.	Pneumonia.	Catarrh.	Polypus Nasi.	Gastritis.	Obstipatio.	Dyspepsia.	Colica.	Hæmatemesis.	Hæmorrhois.	Splenitis.	Hepatitis Acuta.	Hepatitis Chronica.	Icterus.	Orchitis (not Gonorrh).	Arthritis.	Contractura.	Periostitis.	Necrosis.	Herpes.	Impetigo.	Psoriasis.	Eczema.	Pemphigus.	Ecthyma.	Phlegmon.	Abscessus.	Paronychia.	Ulcus.	Acne.	Asthenia.	Ambustia.	Fractura.	Contusio.	Vulnus Inc. et Cont.	Luxatura.	Subluxatio.	Morsus.	Punitus.	Vulnus Sclopet.	Not yet diagnosed.	Admitted.	Died.	Feb. Remittens.	Feb. Typhoides.	Feb. Continua.	Bronchitis Chron.	Pneumonia.	Hæmatemesis.
-	-	-	1	-	-	-	1	-	-	-	7	-	-	1	11	-	-	-	5	4	-	-	-	2	-	-	3	-	-	-	-	1	-	-	-	-	-	12	2	-	7	-	1	-	1	6	8	-	2	-	-	-	-	155	1	-	-	1	-	-	-
-	-	-	1	2	1	-	-	1	1	4	4	9	1	2	-	-	-	1	5	-	-	-	2	1	-	1	1	-	-	3	-	-	-	-	-	1	-	10	6	-	8	-	-	-	-	3	4	-	-	1	1	-	-	261	5	-	4	-	-	1	-
-	-	-	1	-	-	-	-	-	-	-	2	-	-	-	-	-	-	4	17	1	-	1	-	-	-	-	-	-	1	-	-	-	-	-	1	-	-	14	1	5	2	-	3	-	1	5	-	1	1	-	-	1	2	318	3	-	2	1	-	-	-
1	1	3	2	3	-	-	-	-	-	-	10	2	-	-	-	-	-	1	10	-	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	-	19	6	-	2	-	-	1	-	4	2	-	1	-	-	-	-	298	4	2	-	2	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-	-	-	-	1
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	1	-	-	-	-	-	-	-	23	-	-	-	-	-	-	-
-	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	4	-	-	-	-	-	2	-	-	-	-	-	-	26	-	-	-	-	-	-	-
1	-	-	-	1	-	1	-	-	-	-	-	-	-	-	1	-	1	3	-	1	-	1	-	-	-	-	1	-	-	-	-	-	4	1	-	2	-	10	2	-	4	-	-	2	-	3	5	-	4	-	1	-	-	341	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	1	1	1	-	-	-	-	-	1	-	-	-	-	-	-	-	19	1	-	-	-	1	-	-
-	-	-	-	1	-	-	-	-	-	-	-	-	1	-	-	1	-	-	-	-	-	-	-	-	-	1	-	-	-	1	-	-	2	-	-	-	1	13	-	-	-	1	-	-	-	-	4	-	2	-	1	-	-	88	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7	-	-	-	-	-	-	-
2	1	3	6	8	1	1	1	1	1	4	23	13	2	3	12	1	1	9	40	6	1	2	2	3	1	2	5	2	1	4	1	1	6	1	1	3	1	83	18	6	28	1	4	3	2	23	25	1	10	1	3	1	2	1,447	15*	2	6	4	1	1	1

* Exclusive of a case of Suicide.

F. W. INNES, M.D.,
Deputy Inspector-General of Hospitals.

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the first Three Quarters of the Year 1861, for the IONIAN ISLANDS.

Class.	Order.		13 Weeks ended 29th March.		13 Weeks ended 28th June.		13 Weeks ended 27th September.		Total in Nine Months.	
		Average Strength - -	4,060.		4,040.		4,068.			
		Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
		Diseases of nutrition - - -	7	—	4	—	4	—	15	—
IV.		Total Developmental Diseases -	7	—	4	—	4	—	15	—
	1	Accidents - - - - - -	80	1	102	1	66	—	248	2
	2	Battle - - - - - -	—	—	—	—	—	—	—	—
	3	Homicide - - - - - -	—	—	—	—	—	—	—	—
	4	Suicide - - - - - -	—	—	—	—	—	1	—	1
	5	Execution - - - - -	—	—	—	—	—	—	—	—
	6	Punished - - - - - -	3	—	—	—	2	—	5	—
		Not yet diagnosed - - -	4	—	2	—	3	—	9	—
V.		Total violent Deaths or Diseases -	87	1	104	1	71	1	262	3
		General Total { Admitted - - -	568	—	762	—	1,447	—	2,777	—
		General Total { Died - - -	—	10	—	10	—	16	—	36

No. 8.

RETURN showing the NUMBER of ADMISSIONS into HOSPITAL and DEATHS from FEVERS from the various BARRACKS, &c. in CORFU and VIDO, between the 1st of January and 31st of October 1861.

Barracks, &c.	Venetian Barracks Citadel, Corfu.			Bomb-Proof Barracks Citadel.			Lower Fort Neuf Barracks.			Upper Fort Neuf Barracks.			Tents, Fort Neuf.			Huts, Fort Neuf.			Fort Abraham.			Vido Barracks.			Tents and Huts, Vido.			Lazaretto.			TOTAL.		
Corps.	R. A. and 1st Battn. 9th.			R. E. and 2nd Battn. 2nd.			2nd Battn. 4th.			R. A. and 2nd Battn. 4th.			2nd Battn. 4th.			2nd Battn. 4th.			2nd Queen's.			R. A. and 2nd Battn. 2nd. 2nd Battn. 4th. 1st Battn. 9th.			2nd Battn. 2nd. 2nd Battn. 4th. and 1st Battn. 9th.			1st Battn. 9th.			—		
Average Strength.	862	Fever Cases.		728	Fever Cases.		336	Fever Cases.		211	Fever Cases.		66	Fever Cases.		54	Fever Cases.		146	Fever Cases.		374	Fever Cases.		140	Fever Cases.		4	Fever Cases.		No. of Fever Cases.		Average Monthly Strength.
1861.	Monthly Strength.	Admitted.	Died.	Monthly Strength.	Admitted.	Died.	Monthly Strength.	Admitted.	Died.	Monthly Strength.	Admitted.	Died.	Monthly Strength.	Admitted.	Died.	Monthly Strength.	Admitted.	Died.	Monthly Strength.	Admitted.	Died.	Monthly Strength.	Admitted.	Died.	Monthly Strength.	Admitted.	Died.	Monthly Strength.	Admitted.	Died.	Admitted.	Died.	
January - -	879	3	1	720	3	–	338	4	1	196	1	–	—	–	–	69	–	–	130	3	–	471	1	–	99	1	1	4	–	–	16	3	2,906
February -	861	2	1	726	6	–	336	3	1	195	2	–	—	–	–	67	1	–	133	1	–	456	–	–	122	–	–	4	–	–	15	2	2,900
March - -	961	4	–	682	6	–	370	1	–	242	2	1	—	–	–	69	–	–	133	1	–	342	–	–	102	–	–	4	–	–	14	1	2,905
April - -	885	7	1	745	7	–	369	–	–	238	–	–	—	–	–	64	–	–	146	3	–	353	–	–	100	–	–	4	–	–	17	1	2,904
May - -	887	16	1	765	14	–	360	4	–	225	–	–	—	–	–	59	–	–	134	1	–	371	3	–	92	1	–	4	–	–	39	1	2,897
June - -	891	16	1	739	16	–	333	5	1	218	3	–	54	–	–	43	3	–	150	3	–	366	–	–	119	3	–	4	–	–	49	2	2,917
July - -	853	39	2	741	25	–	312	15	1	201	3	–	88	8	–	—	16	–	145	6	–	329	2	–	185	2	–	4	1	–	117	3	2,858
August - -	864	21	–	752	30	3	316	53	–	193	17	–	102	30	–	—	2	–	140	19	–	315	6	1	185	2	–	4	–	1	180	5	2,871
September -	792	14	2	748	16	2	312	12	–	204	3	1	50	14	–	43	–	–	186	7	–	290	3	–	213	1	–	4	–	–	70	5	2,842
October - -	747	13	–	662	9	–	321	3	–	205	2	–	36	1	2	21	2	–	169	2	–	450	2	–	191	–	1	4	–	–	34	3	2,806
Total -	Average 862	135	9	Average 728	132	5	Average 336	100	4	Average 211	33	2	Average 66	53	2	Average 54	24	–	Average 146	46	–	Average 374	17	1	Average 140	10	2	Average 4	1	1	551	26	2,880
Ratio per 1,000 Strength -	Admissions.	156	–	—	181	–	—	297	–	—	156	–	—	803	–	—	444	–	—	315	–	—	454	–	—	71	–	—	–	–	191	–	—
	Deaths	–	10·4	—	–	6·8	—	–	11·9	—	–	9·4	—	–	30·3	—	–	–	—	–	–	—	–	2·6	—	–	14·3	—	–	–	–	9·2	—

Principal Medical Officer's Office,
Corfu, 5th November 1861.

F. WM. INNES, M.D.,
Deputy Inspector General of Hospitals.

RETURN showing the MONTHLY AVERAGE DAILY of SICK in HOSPITAL in the several CORPS in GARRISON, from 1st January to 31st October 1861.

Corps.	Royal Artillery and Engineers.	2nd Battalion 2nd Regiment.	2nd Battalion 4th Regiment.	1st Battalion 9th Regiment.	Total.
Average Strength - - -	543	865	801	671	2,880
January 1861 - - -	1·5	3·7	3·0	0·5	8·7
February " - - -	1·0	2·5	5·5	1·0	10·0
March " - - -	0·7	2·5	4·0	1·0	8·2
April " - - -	0·0	3·5	1·7	2·2	7·4
May " - - -	1·5	6·0	3·5	3·5	14·5
June " - - -	3·5	5·7	7·2	3·7	20·1
July " - - -	1·5	10·0	13·2	13·2	37·9
August " - - -	3·7	14·5	20·7	11·5	50·4
September " - - -	4·7	7·5	13·0	5·5	30·7
October " - - -	8·2	3·7	9·0	1·5	22·4
Average of each Corps -	2·6	5·9	8·0	4·3	—
Deaths in each Corps -	3	4	9	10	26

No. 9.

STATISTICS of SICKNESS and MORTALITY in the MILITARY PRISON, VIDO.

Year ended	Number of Prisoners admitted throughout each Year.	Average Daily Strength of Prisoners.	Average Daily Sick.	Number of Sick Prisoners.						Medical Officer of the Prison Annual Remarks.
				Admitted in Sick Ward of Prison during each Year.	Number of Fever Cases in the above Admissions.	Transferred to Hospital at Corfu for Treatment.	Number of Fever Cases in the above Number transferred.	Total. Sick Prisoners.	Total. Fever Cases.	
31st December 1850 - -	216	$40\frac{132}{365}$	$3\frac{36}{365}$	76	16	4	1	80	17	——
" 1851 - -	214	$34\frac{184}{365}$	$1\frac{156}{365}$	24	1	7	2	31	3	——
" 1852 - -	254	$39\frac{116}{366}$	$1\frac{69}{366}$	17	6	3	1	20	7	——
" 1853 - -	169	$25\frac{64}{365}$	$0\frac{224}{365}$	7	1	3	–	10	1	——
" 1854 - -	155	$24\frac{299}{365}$	$0\frac{196}{365}$	14	4	1	1	15	5	——
" 1855 - -	109	18	$0\frac{244}{365}$	20	5	–	–	20	5	——
" 1856 - -	211	$30\frac{362}{366}$	$0\frac{232}{366}$	22	1	–	–	22	1	Healthy condition of the prisoners very satisfactory.
" 1857 - -	303	39	$1\frac{104}{365}$	12	–	3	–	15	–	Sanitary state of the prisoners excellent.
" 1858 - -	223	$29\frac{99}{365}$	$0\frac{141}{365}$	8	3	6	2	14	5	Sanitary condition of the prisoners extremely good.
" 1859 - -	265	$39\frac{26}{365}$	$0\frac{317}{365}$	17	2	6	1	23	3	Sanitary state of the prisoners excellent.
" 1860 - -	254	$36\frac{277}{366}$	$0\frac{256}{366}$	16	3	6	3	22	6	Sanitary condition of the prisoners good.
From 1st January to 30th September 1861.	237	49	$0\frac{48}{91}$	9	1	4	1	13	2	General health of the prisoners good. (In quarterly reports.)
Average during the above period - - - -	222	33	1·02			Average -		24	4·6	

Principal Medical Officer's Office,
Corfu, 31st October 1861.

F. WM. INNES, M.D.,
Deputy Inspector General of Hospitals.

No. 10.

TABLE showing the NUMBER of MEN in the BARRACKS of CORFU and VIDO for every 50 CUBIC FEET of CONTENTS, from 200 to above 600, and for every 10 SUPERFICIAL FEET of FLOOR SPACE, from 20 to 60.

Name of Barrack.	Cubic Feet.									Superficial Feet.			
	200 to 250.	250 to 300.	300 to 350.	350 to 400.	400 to 450.	450 to 500.	500 to 550.	550 to 600.	Above 600.	20 to 30.	30 to 40.	40 to 50.	50 to 60.
	No. of Men.	No. of Men.	No. of Men.	No. of Men.	No. of Men.	No. of Men.	No. of Men.	No. of Men.	No. of Men.	No. of Men.	No. of Men.	No. of Men.	No. of Men.
Old Venetian A. - -	—	—	—	—	154	—	—	—	—	—	118	36	—
Old Venetian B. - -	36	—	140	221	179	—	—	94	156	36	376	164	250
Bomb-proof - - -	—	—	—	624	—	—	—	—	—	—	624	—	—
Lower Fort Neuf - -	—	—	—	—	—	184	80	—	—	—	96	168	—
Upper Fort Neuf - -	—	80	—	80	—	—	—	—	—	80	80	—	—
Fort Abraham - - -	—	—	—	—	—	—	—	—	56	—	—	56	—
Fort St. George, Vido - -	252	—	—	—	—	—	—	—	—	252	—	—	—
Lunette - - - -	—	—	—	—	—	130	—	—	—	—	—	130	—
Maitland Tower - -	—	—	—	—	28	—	—	—	—	—	—	28	—
Total - - -	288	80	140	925	361	314	80	94	212	368	1,294	582	250

No. 11.

STATEMENT of SUMS paid for WATER SUPPLIED to Her MAJESTY'S TROOPS in the under-mentioned Islands during the Year ended 31st December 1856.

1856.	Paxo.			Sta. Maura.			Cephalonia.			Ithaca.			Zante.			Cerigo.		
	Quantity.	Rate.	Amount.	Quantity.	Rate.	Amount.	Quantity.	Rate.	Amount.	Quantity.	Rate.	Amount.	Quantity.	Rate.	Amount.	Quantity.	Rate.	Amount.
			£ s. d.			£ s. d.	Gallons.	per 100 Gallons. s. d.	£ s. d.	Gallons.	per 100 Gallons. s. d.	£ s. d.	Gallons.	per 100 Gallons. s. d.	£ s. d.	Gallons.	per 100 Gallons. s. d	£ s. d.
January - - -	—	—		—	Per Month.	0 16 0	34,410	0 3	4 6 0	3,844	0 8	1 5 7	1,860	1 0	0 18 7	—	—	—
February - - -	From 8th February to 29th June, 1,287 Barrels.	1*d*. per Barrel.	5 7 3	—		0 16 0	32,190	—	4 0 5	3,596	—	1 3 11	1,740	—	0 17 5	—	—	—
March - - -				—		0 16 0	37,260	—	4 13 2	3,844	—	1 5 7	1,860	—	0 18 7	—	—	—
April - - -				—		0 15 0	50,400	0 2½	5 5 0	3,858	—	1 5 9	1,800	0 6	0 9 0	—	—	—
May - - -				—		0 15 0	80,836	—	8 8 5	4,020	—	1 6 10	24,954 1,080	1 0 0 6	12 14 11	—	—	—
June - - -				—		0 15 0	75,900	—	7 18 1	3,900	—	1 6 0	26,460 1,800	1 0 0 6	13 13 7	—	—	—
July - - -	From 30th June to 15th Nov., 4,191 Barrels.	5 3/10*d*. per Barrel.	92 11 0	—		0 15 0	78,430	—	8 3 5	4,030	—	1 6 10	30,876 1,860	1 0 0 6	15 18 0	—	—	—
August - - -				—		0 15 0	83,080	—	8 13 0	4,018	0 5½	0 18 5	28,006 1,080	1 0 0 6	14 5 5	990	1 6	0 14 10
September - -				—		0 15 0	80,400	—	8 7 6	3,720	—	0 17 0	24,984	1 0	12 9 10	3,300	—	2 9 6
October - - -				—		0 15 0	83,080	—	8 13 0	3,976	—	0 18 2	21,584 1,160	1 0 0 6	11 1 7	3,410	—	2 11 1
November - -	From 16th Nov. to 20th Dec., 1,050 Barrels.	1*d*. per Barrel.	4 7 6	—		0 15 0	80,400	—	8 7 6	3,900	—	0 17 10	19,500 1,800	1 0 0 6	10 4 0	3,300	—	2 9 6
December - -				—		0 15 0	36,580	—	3 16 2	4,030	—	0 18 5	1,860	0 6	0 9 4	3,410	—	2 11 2
	Total -	- - £	102 5 9	Total -	- - £	9 3 0	Total -	- - £	80 11 8	Total -	- - £	13 10 4	Total -	- - £	94 0 3	Total -	- - £	10 16 1

RECAPITULATION - -		£ s. d.
	Paxo - - -	102 5 9
	Sta. Maura - -	9 3 0
	Cephalonia - -	80 11 8
	Ithaca - .. -	13 10 4
	Zante - - -	94 0 3
	Cerigo - - -	10 16 1
	Total - - £	310 7 1

Commissariat, Ionian Islands,
Corfu, 11th March 1857.
KEAN OSBORN,
Assistant Commissary-General.

No. 12.

TABLE OF MORTALITY at Santa Maura. Five Years from 1st January 1856 to 31st December 1860.

Diseases.	1856.		1857.		1858.		1859.		1860.	
	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.
Owing to the total want of medical men in the country, the undersigned cannot give a detailed account of the fatal diseases. But the most prevalent are remitting and intermitting fevers, caused by the several marshes that are about the country, inflammations of the thorax and abdomen, tubercles of the lungs, marasmus among children.	230	206	216	207	211	182	169	141	175	207
Population - - -	10,569	9,314	10,617	9,459	10,658	9,470	10,769	9,581	10,880	9,692

N.B.—This amount of population has been taken from the statistics of the Regent's office. But the Medical Board of Health, that got registered the population of last year (1860), found that the number of inhabitants of this island amounted to 21,000, viz., 10,992 males, and 10,008 females.

Dr. G. Cavadia, Protomedico.

Visto, E. F. Barr, Director of Health.

Sta. Maura, the 4th December 1861.

DISEASES and MORTALITY in the CIVIL HOSPITAL at AMAXECHI, SANTA MAURA, during Five Years, from 1856 to 1860.

Diseases.	Males.		Females.	
	Admissions.	Deaths.	Admissions.	Deaths.
Adynamia - - -	2	—	—	—
Apostema - - -	5	—	—	—
Arthritis - - -	4	1	1	—
Amaurosis - - -	2	—	1	—
Apoplexia - - -	2	2	2	2
Asthma - - -	1	1	—	—
Atrophia - - -	—	—	1	1
Angina tonsillaris -	1	—	1	—
Ascites - - -	1	1	1	—
Amblyopia - - -	1	—	1	—
Blennorrhagia - -	5	—	13	—
Bronchitis - - -	32	1	2	—
Bronchopneumonia -	1	1	—	—
Carcinoma - - -	1	—	—	—
Combustio - - -	1	—	—	—
Contusio - - -	5	—	—	—
Cachexia - - -	14	2	—	—
Cataracta - - -	1	—	—	—
Contractura - -	—	—	1	—
Commotio cerebri -	2	—	—	—
Dementia - - -	—	—	4	—
Diarrhœa - - -	7	4	—	—
Dysenteria - - -	2	—	—	—
Epilepsia - - -	3	—	2	—
Emphysema pulmonum	1	1	—	—
Encephalopathia - -	3	—	—	—
Enteralgia - - -	1	—	—	—
Enteritis chronica -	1	1	—	—
Eczema - - -	3	—	—	—
Erysipelas - - -	4	1	—	—
Favus - - -	3	—	—	—
Febris intermittens -	70	—	5	—
„ gastrica - -	46	1	3	—
„ rheumatica -	21	—	—	—
„ typhosa - -	11	—	1	—
„ biliosa - -	5	1	1	—
„ nervosa - -	1	—	—	—
„ remittens - -	2	—	—	—
„ intermittens perniciosa -	1	1	—	—
Gastralgia - - -	2	1	—	—
Hernia - - -	4	—	—	—
Hypertrophia hepatis -	7	—	—	—
Hemicrania - -	1	—	—	—
Hemiplegia - -	2	—	—	—
Leucophlegmasia - -	—	—	1	—
Marasmus - - -	2	1	2	2
Morsus - - -	1	—	—	—
Febris puerperalis -	—	—	2	—
Necrosis - - -	3	—	—	—
Nephritis - - -	3	1	—	—
Meningitis - -	2	2	—	—
Lupus - - -	2	—	1	—
Ophthalmia - - -	2	—	—	—
Otitis - - -	1	—	—	—
Neuralgia - - -	1	—	—	—
Orchitis - - -	2	—	—	—
Pleurodynia - -	2	—	—	—
Peripneumonia - -	7	2	—	—
Phthisis laryngea -	1	1	—	—
Phlegmon - -	1	—	—	—
Parotitis - - -	2	—	—	—
Paronychiasis - -	1	—	—	—
Pterygion - - -	1	—	—	—
Pleuritis - - -	4	—	2	—
Rheumatismus - -	14	—	1	—
Scabies - - -	4	—	—	—
Syphilis - - -	7	2	5	—
Scrophulosis - -	1	—	2	1
Paralysis - - -	1	—	—	—
Tuberculosis pulmonum	8	3	1	1
„ oss. tibiæ -	1	—	—	—
Ulcera - - -	5	—	1	—
Stuprum et consequentia	—	—	1	—
Vulnus - - -	27	—	—	—
Hydrocele - - -	2	—	—	—
Stomatitis - - -	1	—	—	—
Helmynthiasis - -	2	—	1	1
Odontalgia - - -	1	—	—	—
Urolithiasis - -	1	—	—	—
Pseudoerysipelas -	1	—	1	—
Fistula - - -	1	—	—	—
Carcinoma - - -	1	—	—	—
Gonnarthrocace - -	2	1	—	—
Hæmorroides - -	1	—	—	—
Total -	395	33	61	8

Visto, E. F. Barr, Director of Health.

Dr. G. Cavadia, Protomedico.

No. 13.

DISEASES, ADMISSIONS, and DEATHS among the TROOPS at SANTA MAURA for 10 Years, from 1st April 1850 to 31st March 1860.

Average Strength, 120.

Diseases.	Admitted.	Died.
Fevers :—		
Intermittent - - - -	113	2
Remittent - - - -	30	4
Continued - - - -	65	2
Typhus - - - -	3	2
Eruptive - - - -	2	—
Diarrhœa - - - -	18	—
Dysentery - - - -	9	1
Hepatic diseases - - -	6	—
Rheumatism - - - -	27	—
Phthisis - - - -	5	2
Other pulmonary diseases - -	66	—
All other diseases - - -	468	2

No. 14.

TWO YEARS METEOROLOGICAL OBSERVATIONS at ITHACA, from 1st January 1857 to 31st December 1859.

Months.	Thermometric Means.				Winds.		Days of Sunshine.	Rainy Days.	Remarks.
	8 A.M.	Noon.	8 P.M.	Mean of Day.	Direction.	Force.			
	°	°	°	°					
January - -	55	56	55	55·3	S.W.	High	19	8	—
February - -	53·41	55	53·52	54·4	W.S.W.	Do.	23	8	—
March - - -	54·45	56	54·26	55·6	S.N.W.N.	Moderate	27	8	Hail.
April - - -	64	65	64	64·3	S.W.	Do.	28	3	—
May - - -	70	71	71	70·6	N.W.	Do.	27	3	—
June - - -	73	74	75	74	S.E.	Calm	24	—	Lightning.
July - - -	81	83	81	81·6	N.W.	Do.	31	1	—
August - - -	84·21	83·10	84·5	84·5	N.W.	Do.	28	—	—
September - -	74·7	76	73·2	74	W.	Moderate	27	2	Thunder.
October - -	72	74	72	72·6	N.	Do.	27	2	Thunder & Lightning.
November - -	62	62·28	62·26	62·14	N.E.	Do.	14	3	—
December - -	55·28	57·14	56·10	56·17	N.E. S.E.	High	19	8	—

No. 15.

MORTALITY, ADMISSIONS, and DISEASES among an AVERAGE STRENGTH of 54 MEN at ITHACA, during Seven Years, from April 1853 to December 1859.

Diseases.	Admitted.	Died.
Fevers :—		
Intermittent - - - -	24	—
Remittent - - - -	9	—
Continued - - - -	23	—
Diarrhœa - - - - -	19	—
Dysentery - - - -	7	—
Hepatic disease - - -	1	—
Rheumatism - - - -	11	—
Phthisis - - - -	2	—
Other pulmonary diseases - -	27	—
All other diseases - - -	164	1

No. 16.

TOTAL DISEASES, ADMISSIONS, and DEATHS among an AVERAGE STRENGTH of 603 MEN in CEPHALONIA, for 10 Years, from 1st April 1850 to 31st March 1860.

Diseases.	Admitted.	Died.
Fevers :—		
Intermittent - - - - -	612	—
Remittent - - - - -	458	28
Continued - - - - -	2,205	27
Typhus, Typhoid, Synochus - -	3	1
Eruptive - - - - -	5	—
Cholera - - - - -	61	37
Diarrhœa - - - - -	656	1
Dysentery - - - - -	75	6
Hepatic diseases - - -	92	1
Rheumatism - - - - -	236	—
Phthisis - - - - -	27	11
Other pulmonary diseases - -	454	2
All other diseases - - -	3,937	18
Total, 10 Years - - -	8,821	132

No. 17.

STATISTICA MEDICA DELL' ISOLA DI ZANTE.

Anno.	Popolazione.			Nascite.			Morti.			Differenza fra Nascite e Morti.		
	Maschi.	Femmine.	Totale.	Maschi.	Femmine.	Totale.	Maschi.	Femmine.	Totale.	Più.	Meno.	Nascite più delle Morti.
1856	20,136	17,017	37,153	400	338	738	514	465	979	—	241	Nei 5 anni numero medio della popolazione - „ „ „ delle nascite - - „ „ „ delle morti - - Onde risulterebbero nascite di più -
1857	19,747	17,298	37,045	709	590	1,299	540	523	1,063	236	—	
1858	19,651	17,308	36,959	693	600	1,293	448	441	889	404	—	
1859	20,408	17,765	38,173	758	660	1,418	391	375	766	652	—	
1860	20,236	17,767	38,003	696	609	1,305	359	349	708	597	—	
—	—	—	—	3,256	2,797	6,053	2,252	2,153	4,405	1,889	241	37,466 1,210 881 1,648

OSSERVAZIONE.

1$^{\text{mo}}$. In questi 5 anni le nascite superano le morti di 1,648 individui, per cui la popolazione dovrebbe essere più aumentata di quello che si osserva in questo quadro, ma non lo è atteso l'emigrazione nel prossimo continente Greco.

2$^{\text{do}}$. Nella città, abitata da 15 mila individui, morirono negli ultimi 5 anni 2,230, e nella campagna abitata da quasi 23 mila individui, morirono 2,175. In tutta l'isola, la mortalità fu di 2¼ ꝑ °/o, però in città fu di quasi 3 ꝑ °/o, e nella campagna meno del 2 ꝑ °/o, e questo deve attribuirsi alla maggiore povertà degli abitanti della città, alle arti, e mestieri che professano, ai vizj, ed alla mal' aria di alcune situazioni della città.

Ogni anno secondo i registri sanitarj si vaccinano in città ed in campagna più di 1,000 bambini, e la vaccinazione viene mantenuta, più o meno, in tutto l'anno.

MALATTIE DOMINANTI.

Febbri gastriche, e gastriche biliose, intermittenti e remittenti, che spesso prendono il carattere di perniciose, e febbri tifoidi. Queste malattie sono più frequenti nell' estate, e di autuno, e quando la primavera è piovosa, desse prendono talvolta ûn carattere epidemico. Attacano specialmente li abitanti delle due estremità della città, e cio si attribuisce alle acque stagnanti che esistono presso l'estremità meridionale alle colline esistenti presso alla parte settentrionale che impediscono il libero movimento dell' aria, ed alla povertà degli abitanti delle due suddette situazioni. Si osservano pure tali malattie in campagna, in quelle situazioni ove esistono acque stagnanti. Oltre le suddette malattie, si osservano pure malattie flogistiche, come per esempio bronchiti, pneumoniti, disenterie, diarée, reumatismi acuti. Talvolta si osservano sporadicamente, od in istato di epidemia, febbri esantimatiche, e l'angina dif-

terica, che solo da pochi anni si osservò nel paese con carattere epidemico, si presenta tutt' ora sporadicamente : spesso si vedono dei casi di tisi tubercolare, non pero come negli anni antecedenti. Rarissimi sono i casi di croup. Raramente s'incontrano i calcoli della viscica, mentre la renella si osserva più spesso. In qualche villaggio dell' isola si presentano qualche caso di elefantiasis dei Greci.

Da alcuni anni le malattie diminuirono di molto, ed ammigliorò lo stato jgienico del paese, e ciò si deve attribuire alla coltivazione di molti terreni che erano incolti, alla formazione di alcune strade campestri, all' introduzione delle acque nella città, ed in generale al miglior sistema di vita degli abitanti.

Le condizioni jgieniche migliorerebbero di più, ove si prendessero misure per diseccare varj terreni dalle acque stagnanti, e coltivarli ; collo scavo del porto che da anno in anno si rende più dannoso alla salute pubblica, colla formazione di nuove strade in certe situazioni che sono ancora incolte, e finalmente nella città con un ammiglioramento delle condizioni jgieniche nell' ospizio dell' ospedale civile.

Ospedale Civile.

L'Ospedale Civile contiene 40 letti parte dei quali sono occupati da Vecchi Invalidi come per regolamento municipale i rimanenti vennero occupati come segue.

Anno.	Ammalati Introdotti.	All' Ospedale Morti.	Sortiti.	Malattie Predominanti.
1856	76	20	45	Sifilide, febbre intermittente, tifoide gastrica.
1857	59	12	42	Piaghe venéree, tubercoli polmonari, idrope.
1858	56	18	35	Febbri intermittenti, affezioni reumatiche.
1859	46	9	22	Affezioni reumatiche scrofolose e piaghe.
1860	54	11	34	Sifilide, tubercoli, febbri intermittenti.
Totale -	291	70	178	

Direttore di Sanità, e Presidente della Commissione Medica,
Zante, li 8 Novembre 1861.
J. Jolly.
Spirid Carvella, Protomedico.

No. 18.

Table of Diseases, Admissions, and Deaths among British Troops serving in Zante between 1st April 1850 and 31st March 1855 ; also between 21st August 1856 and 31st December 1859. Average Strength during 8 years and 4 months, 394.

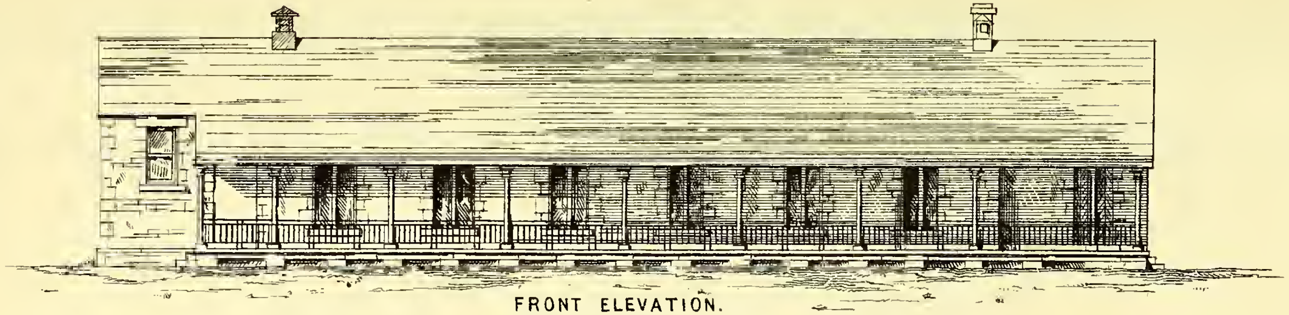
Diseases.	Admitted.	Died.
Fevers :		
Intermittent - - -	160	—
Remittent - - - -	28	1
Continued - - - -	763	13
Typhus - - - -	7	2
Eruptive - - - -	1	—
Diarrhœa - - - -	413	—
Dysentery - - - -	185	3
Hepatic diseases - - -	33	—
Rheumatism - - - -	192	—
Phthisis - - - -	9	7
Other pulmonary diseases - -	260	2
All other diseases - - -	2,146	4
Total, 8 years and 4 months -	4,197	32

During the period omitted from this return a militia regiment garrisoned Zante. The usual records were not left at the garrison hospital by the troops. A special report, however, remains to show that from 25th October to 21st November cholera raged among the troops in common with the towns-people. 31 admissions are reported, of which 24 ended in death ; only seven cases recovered. The disease did not seem to affect castle or town occupants in particular.

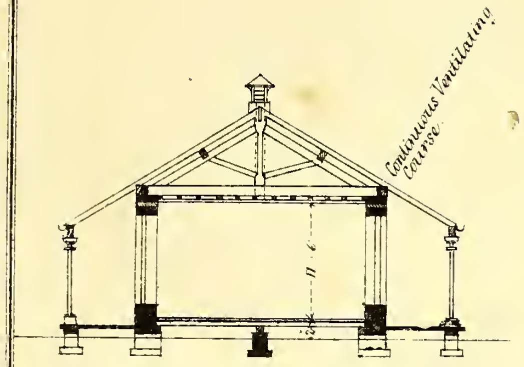
LONDON:
Printed by George E. Eyre and William Spottiswoode,
Printers to the Queen's most Excellent Majesty.
For Her Majesty's Stationery Office.

BARRACK HUT FOR 24 MEN.

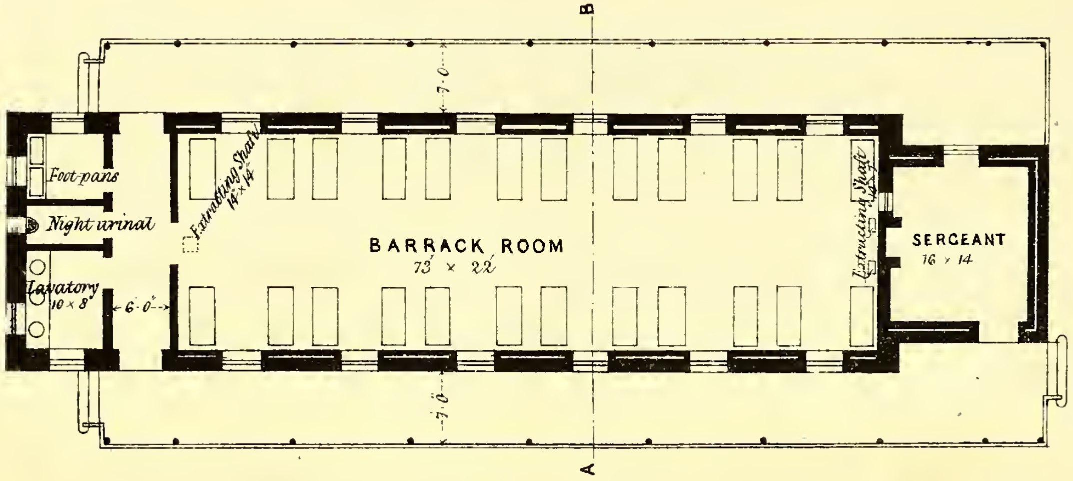
ALLOWING 760 CUBIC FEET PER MAN.



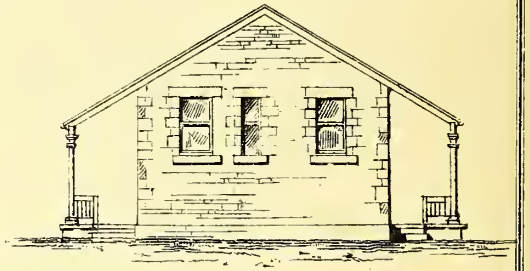
FRONT ELEVATION.



SECTION ON THE LINE A.B.



PLAN.



END ELEVATION.

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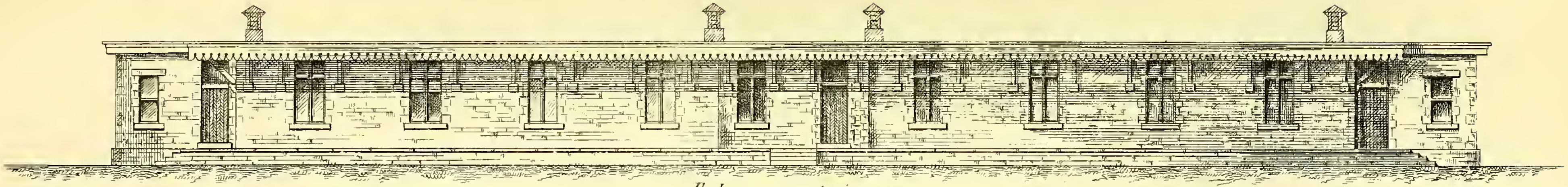
London School of [illegible]

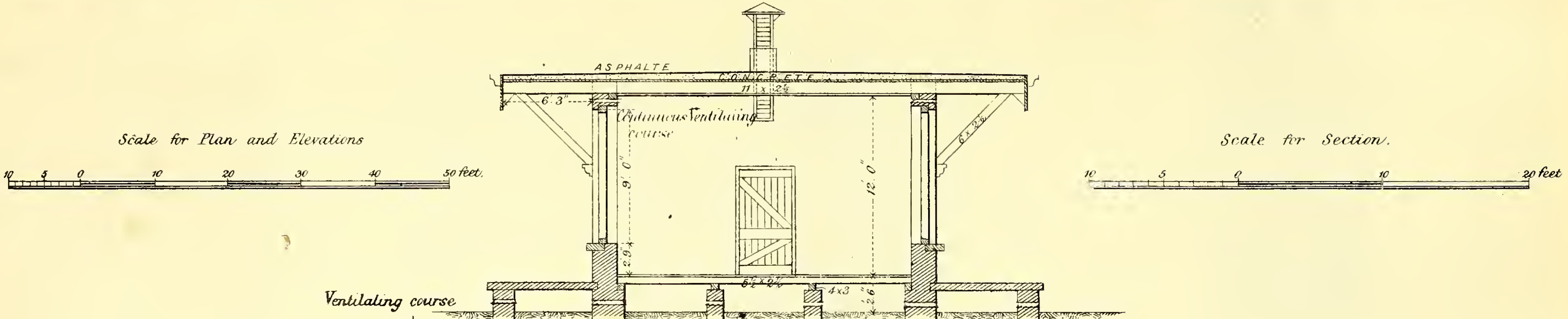
CERIGO

PROPOSED BARRACKS.

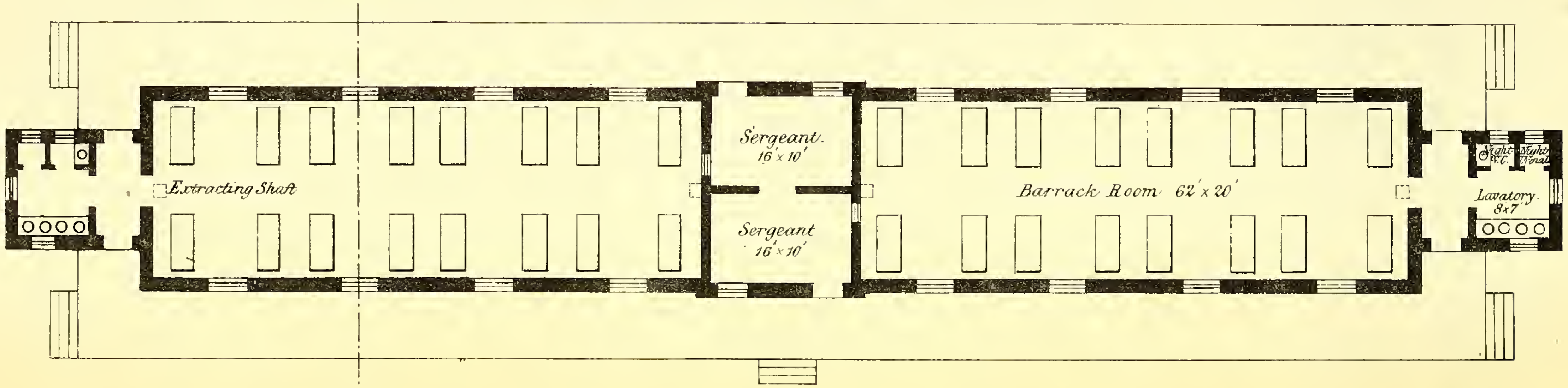
Plan II.



Elevation



Section on the line A.B.



Plan

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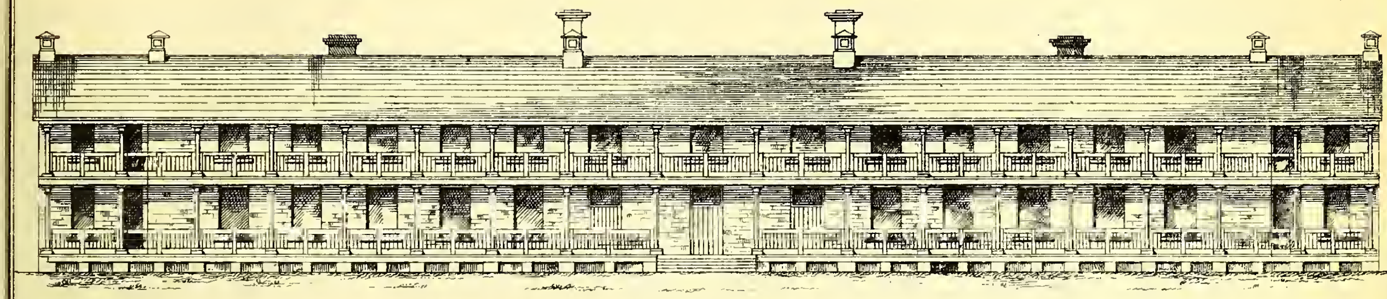
School of Hygiene ... ical ...
22 AUG 192

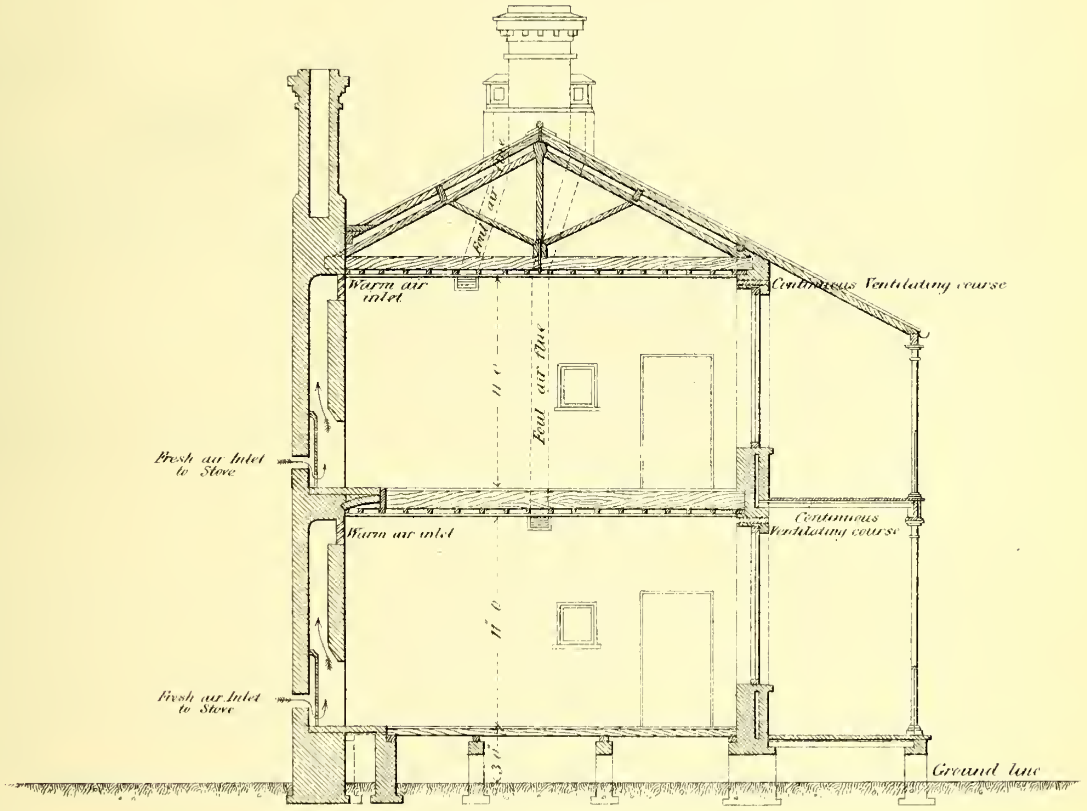
SOLDIER'S BARRACKS.

For 4 N.C.O^s and 72 Men.

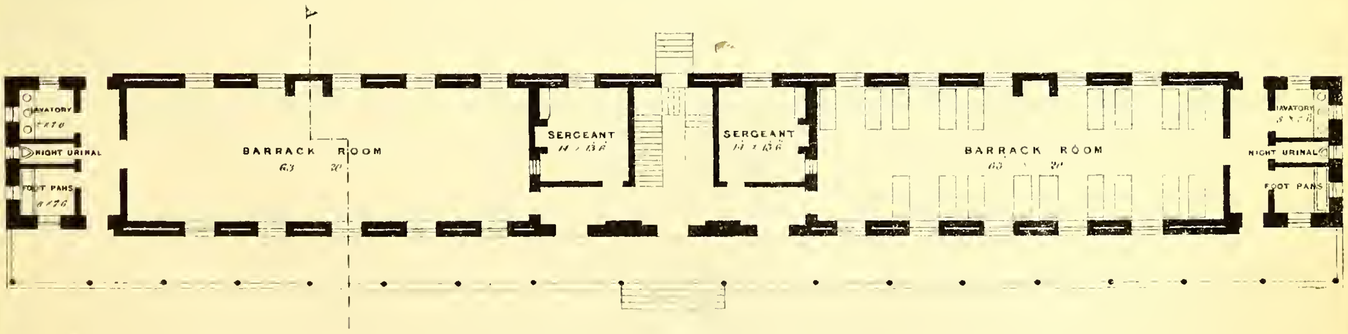
Allowing 750 cubic feet and 70 superficial feet per man.



Elevation



Section on the line A B



Plan of Ground Floor

Scale of Feet to Plan & Elevation

Scale of Feet to Section.

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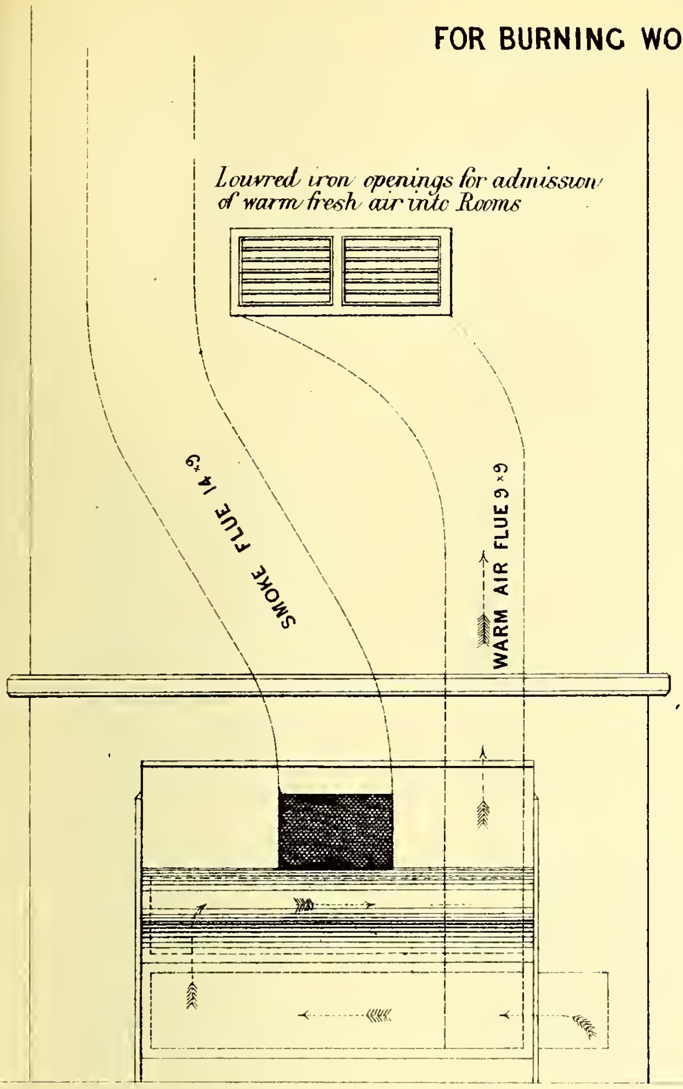
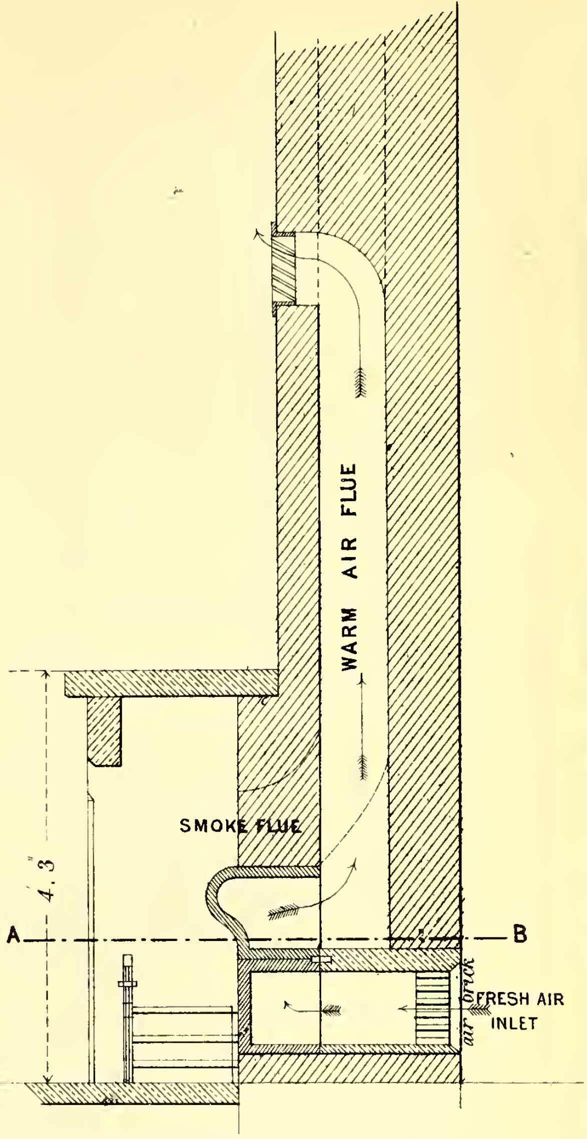
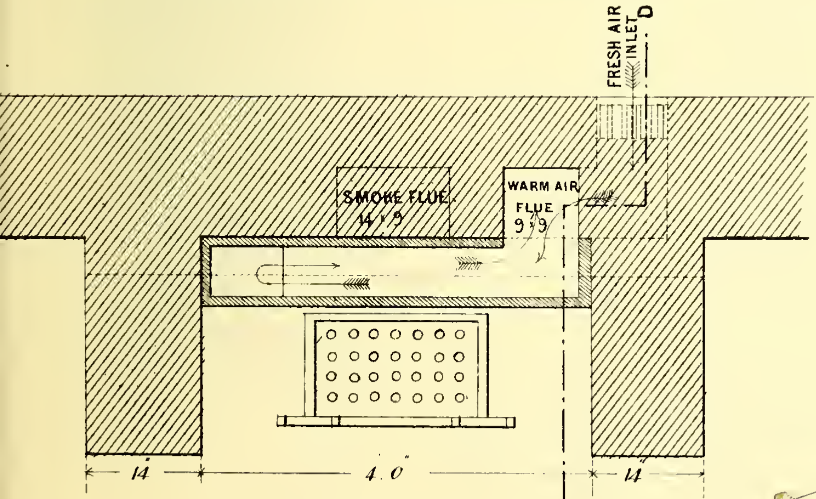
DETAILS. OF FIREPLACE
FOR BURNING WOOD


Louvred iron openings for admission of warm fresh air into Rooms
SMOKE FLUE 14 × 9
WARM AIR FLUE 9 × 9

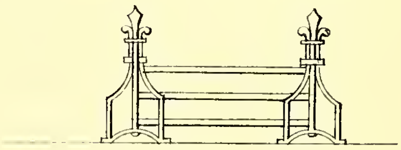
ELEVATION OF FIRE PLACE



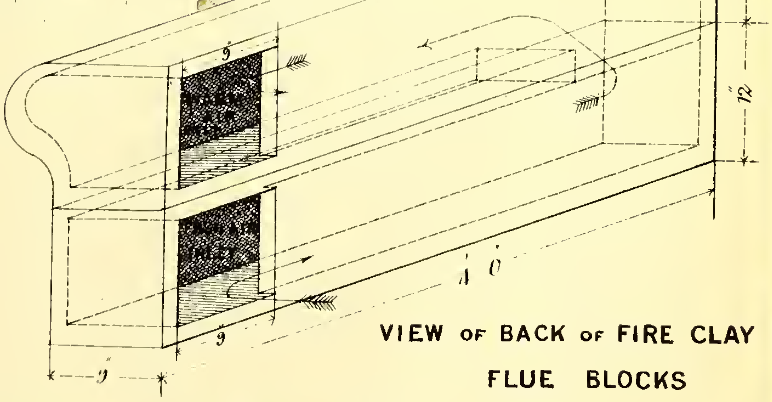
SECTION C.D ON PLAN.



PLAN AT A.B



ELEVATION OF FIRE DOGS



VIEW OF BACK OF FIRE CLAY FLUE BLOCKS

SCALE OF FEET

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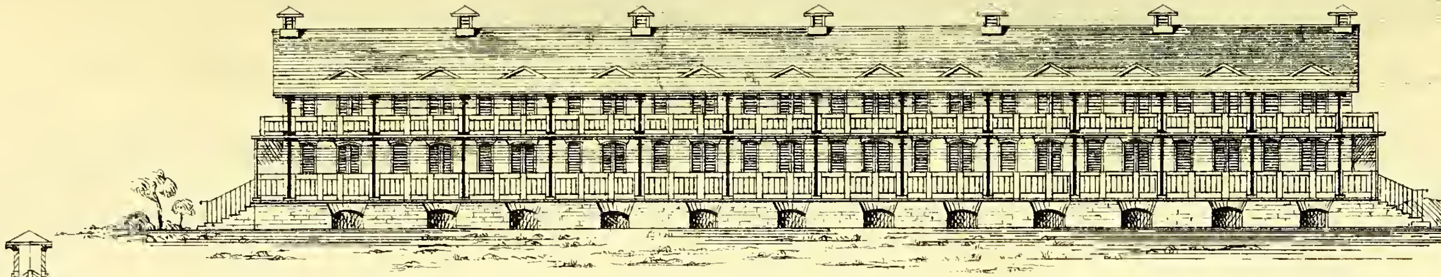
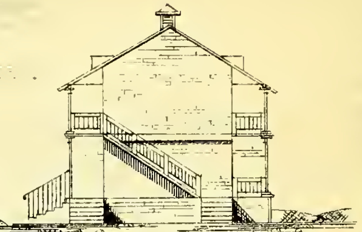
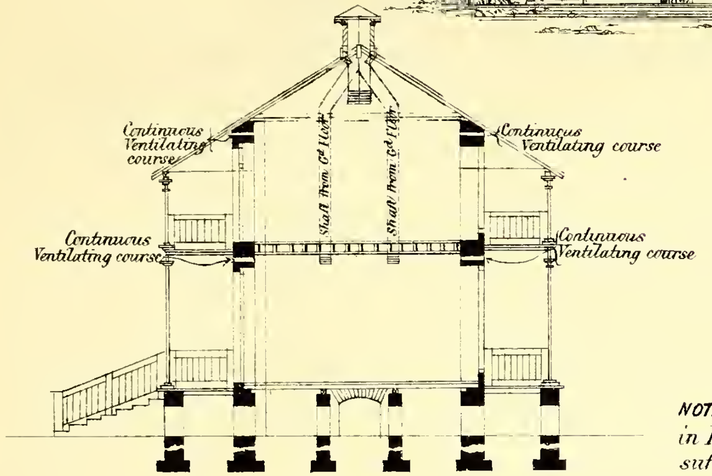




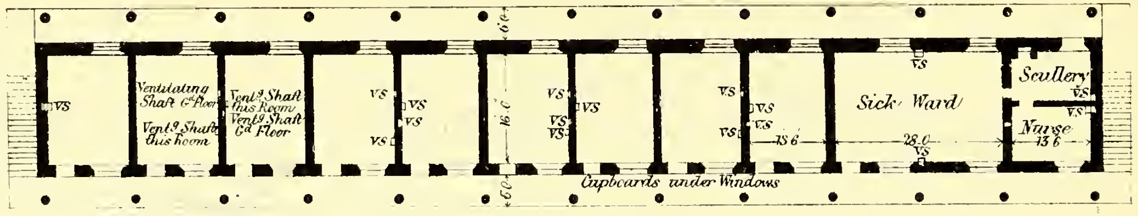
END ELEVATION

MARRIED SOLDIER'S QUARTERS

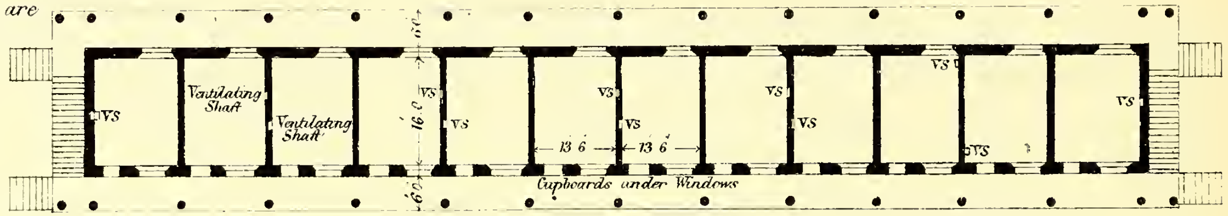

Continuous Ventilating course
Continuous Ventilating course
Shaft from Gd Floor
Shaft from Gd Floor
Continuous Ventilating course
Continuous Ventilating course

SECTION. A.B

NOTE One Sick Ward as shewn in First Floor Plan is considerd sufficient when two Blocks are required.

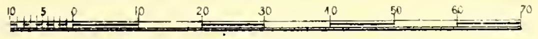


FIRST FLOOR PLAN

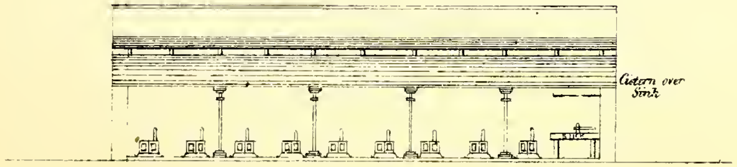


GROUND PLAN

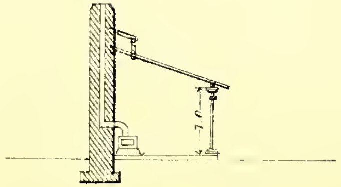
SCALE OF FEET



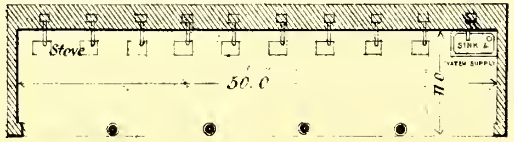
COOK HOUSE



ELEVATION



SECTION AB



PLAN

SCALE OF FEET TO COOK HOUSE

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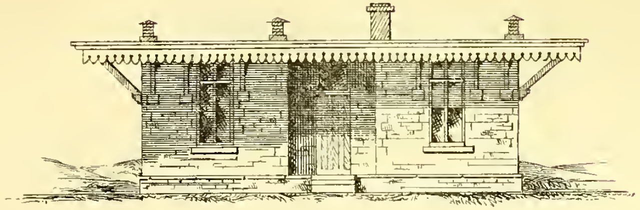
22 AU 192

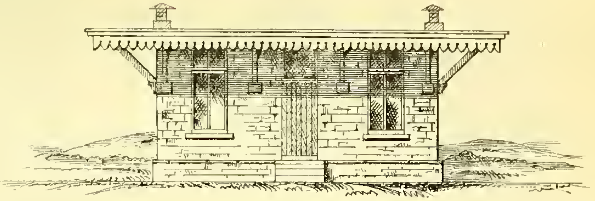
CERIGO

MARRIED SOLDIERS QUARTERS

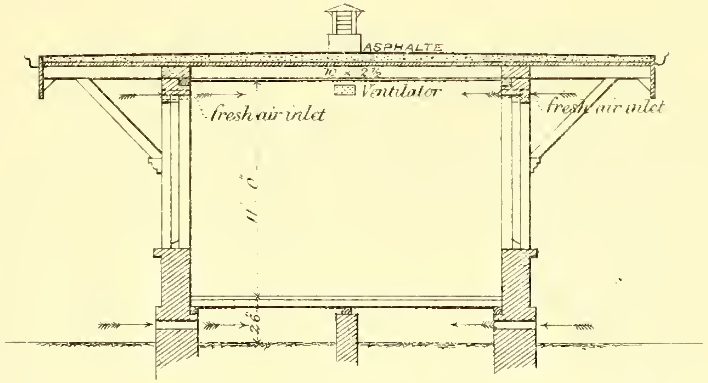
GUARD HOUSE & CELLS.



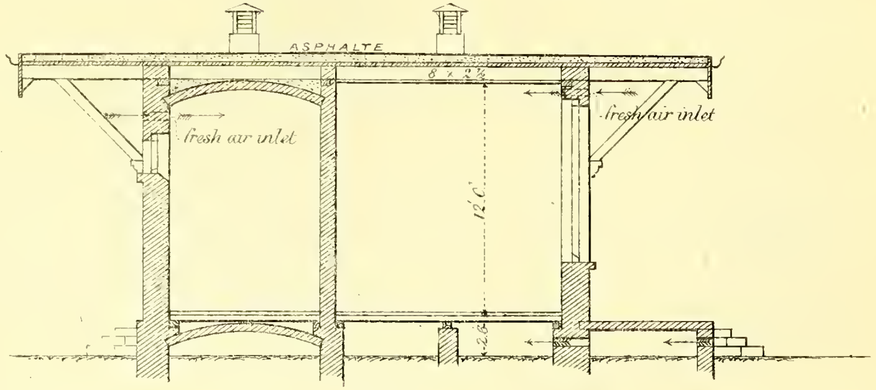
Elevation



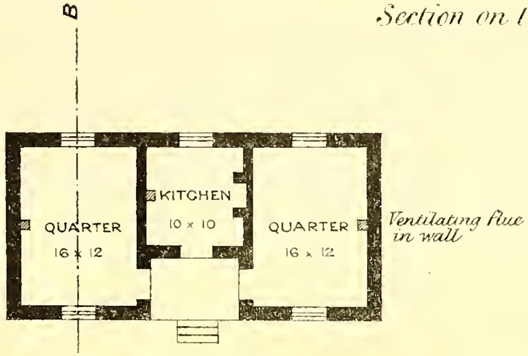
Elevation



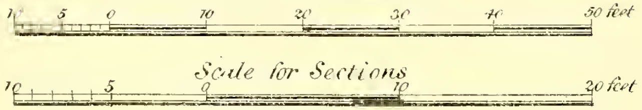
Section on the line A. B.

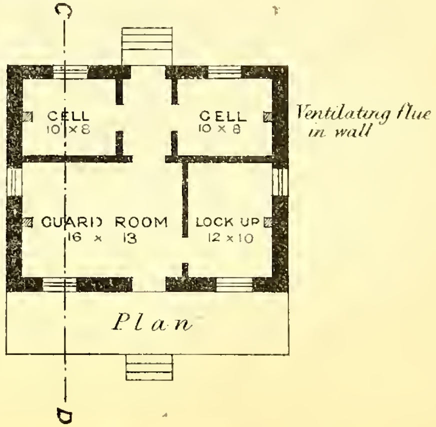


Section on the line C. D.



Plan





Plan

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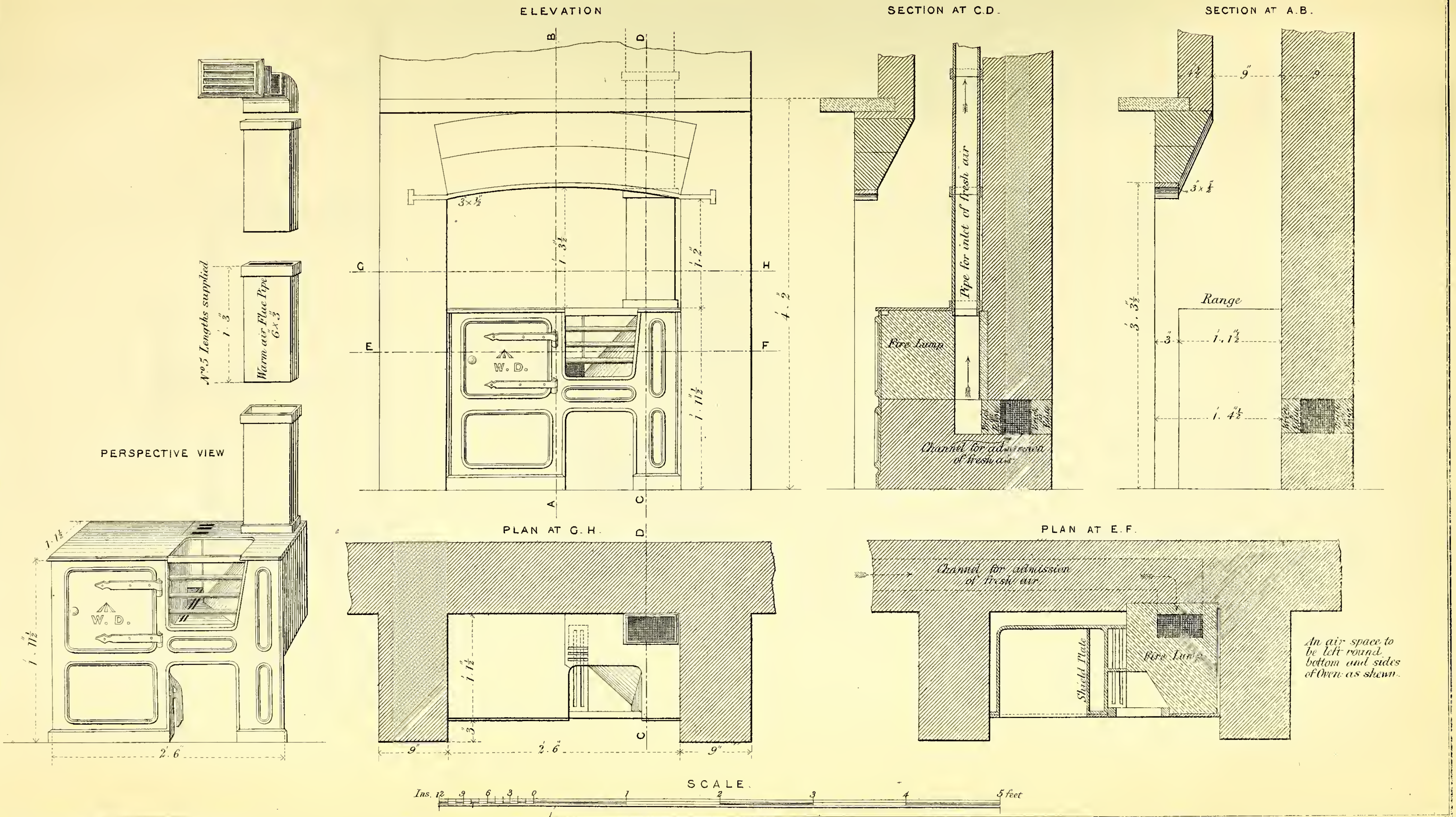
22

Plan VII.

RANGE FOR MARRIED SOLDIERS' QUARTERS.

MADE FOR THE WAR DEPARTMENT BY MESSRS BENHAM, WIGMORE STREET.

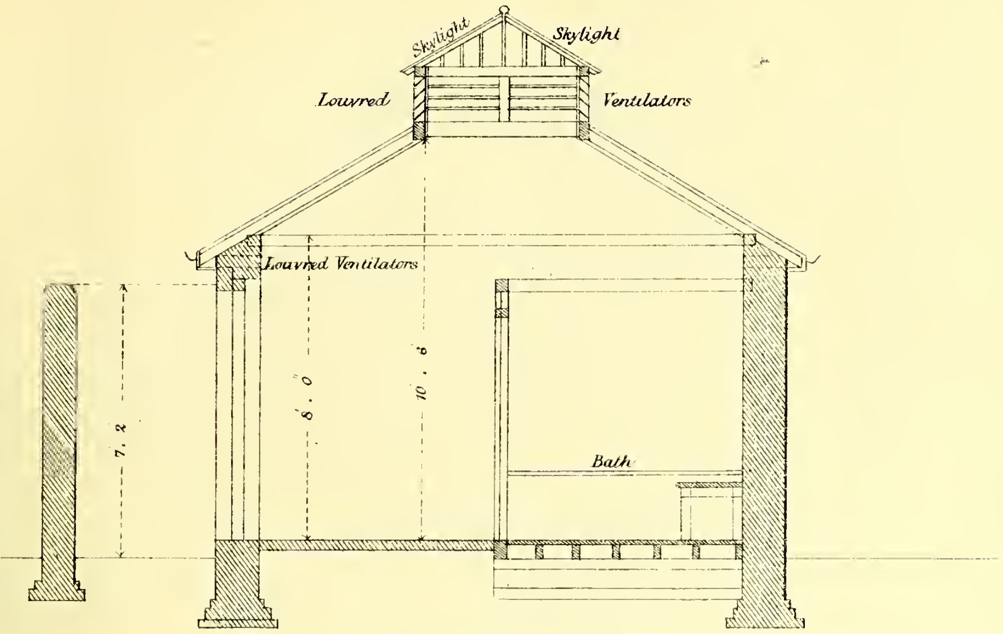


Day & Son. Lithrs to the Queen

London School of [illegible] cal [illegible]
22 A[illegible] 192[illegible]

Plan VIII.

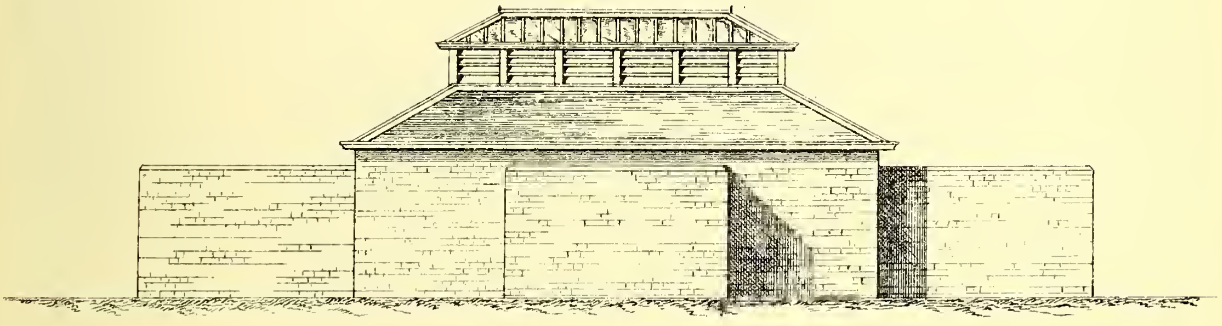
LATRINES ABLUTION ROOMS &c. FOR MARRIED SOLDIERS' QUARTERS



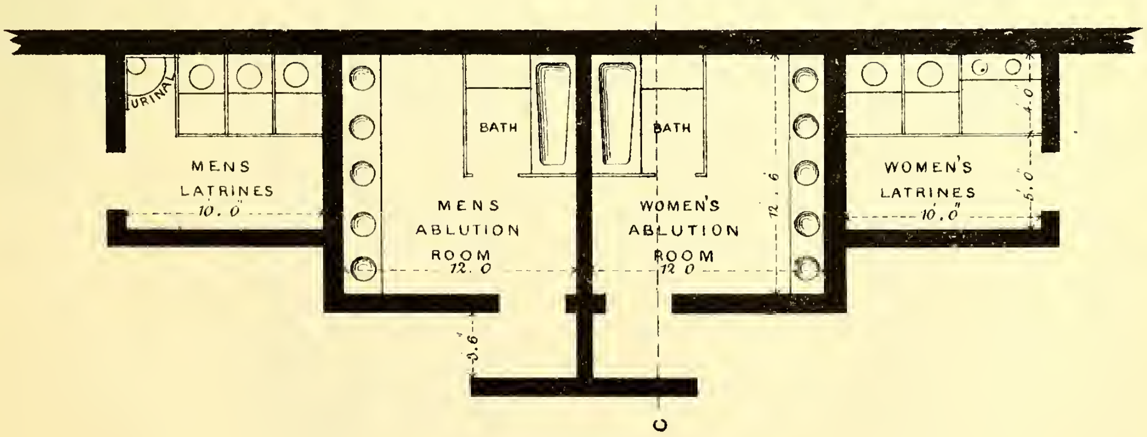
SECTION THRO' C D.

5 4 3 2 1 0 5 10 15 feet

SCALE TO SECTION



ELEVATION



PLAN

SCALE TO PLAN AND SECTION

10 5 0 10 20 30 ft

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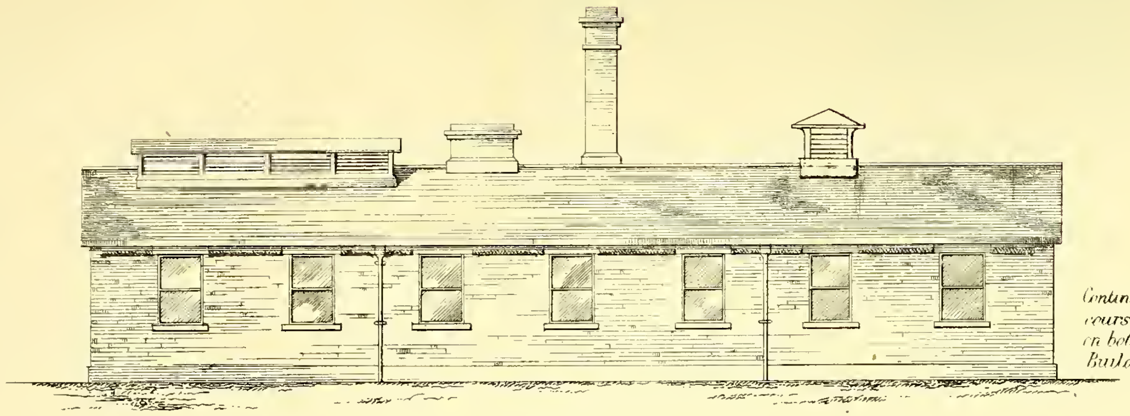
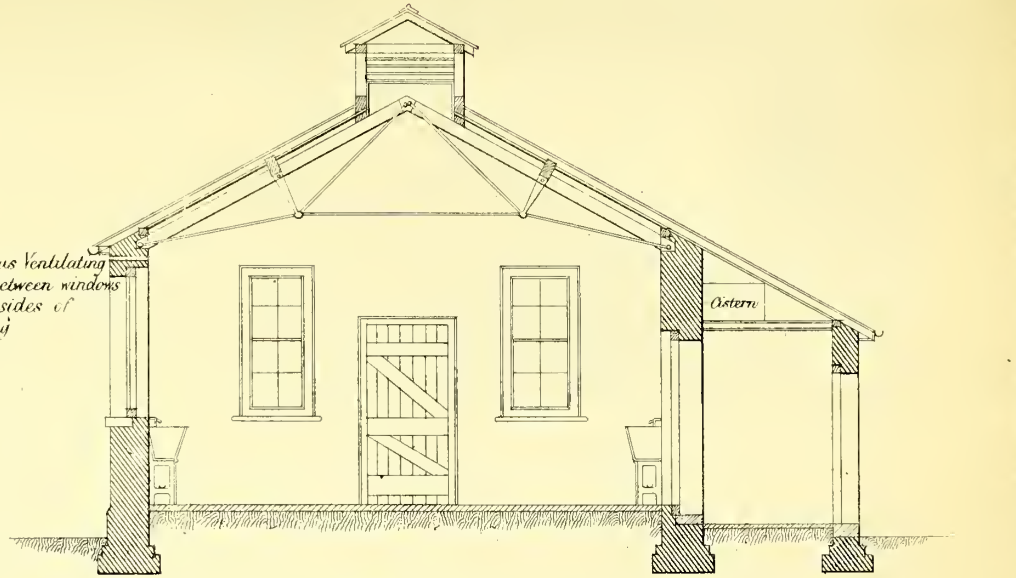
WASH HOUSE & LAUNDRY.



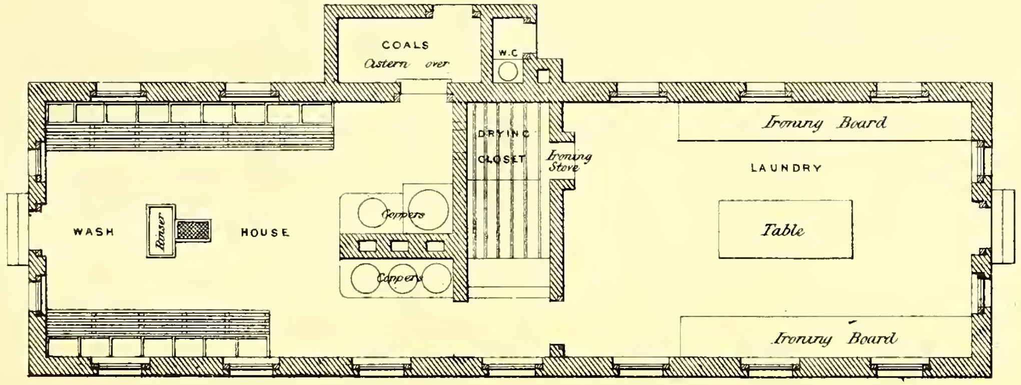
ELEVATION

Cold Water only to be laid on to the Washing tubs.
The Ironing Stove & Drying Closet to be of the pattern
made for the War Department by Mess.rs Jeakes & Co



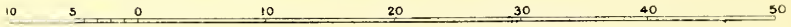
Continuous Ventilating course between windows on both sides of Building

SECTION

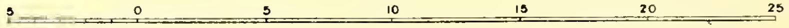


PLAN

SCALE OF FEET FOR PLAN AND ELEVATION



SCALE OF FEET FOR SECTION



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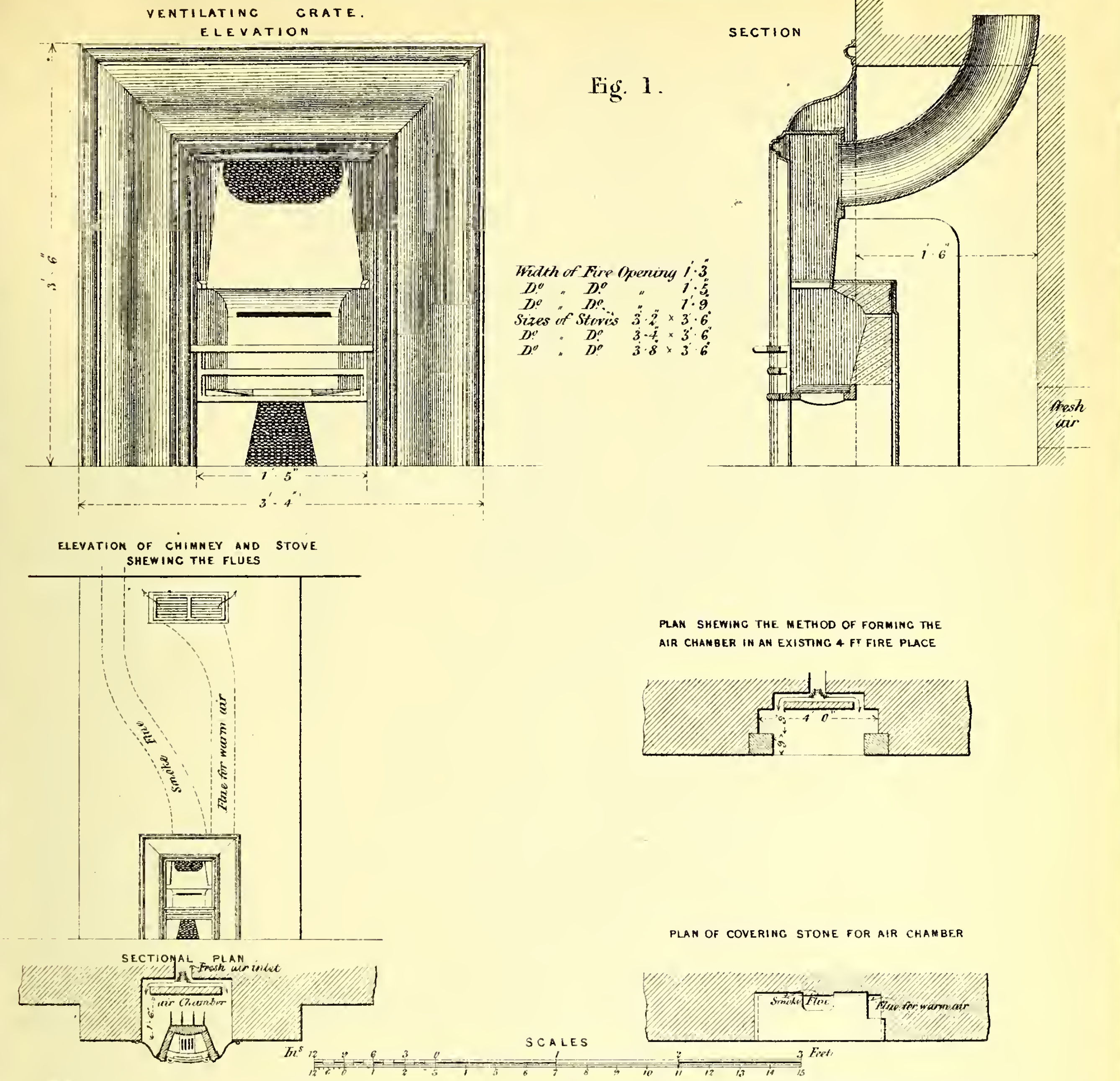
22

Plan X.

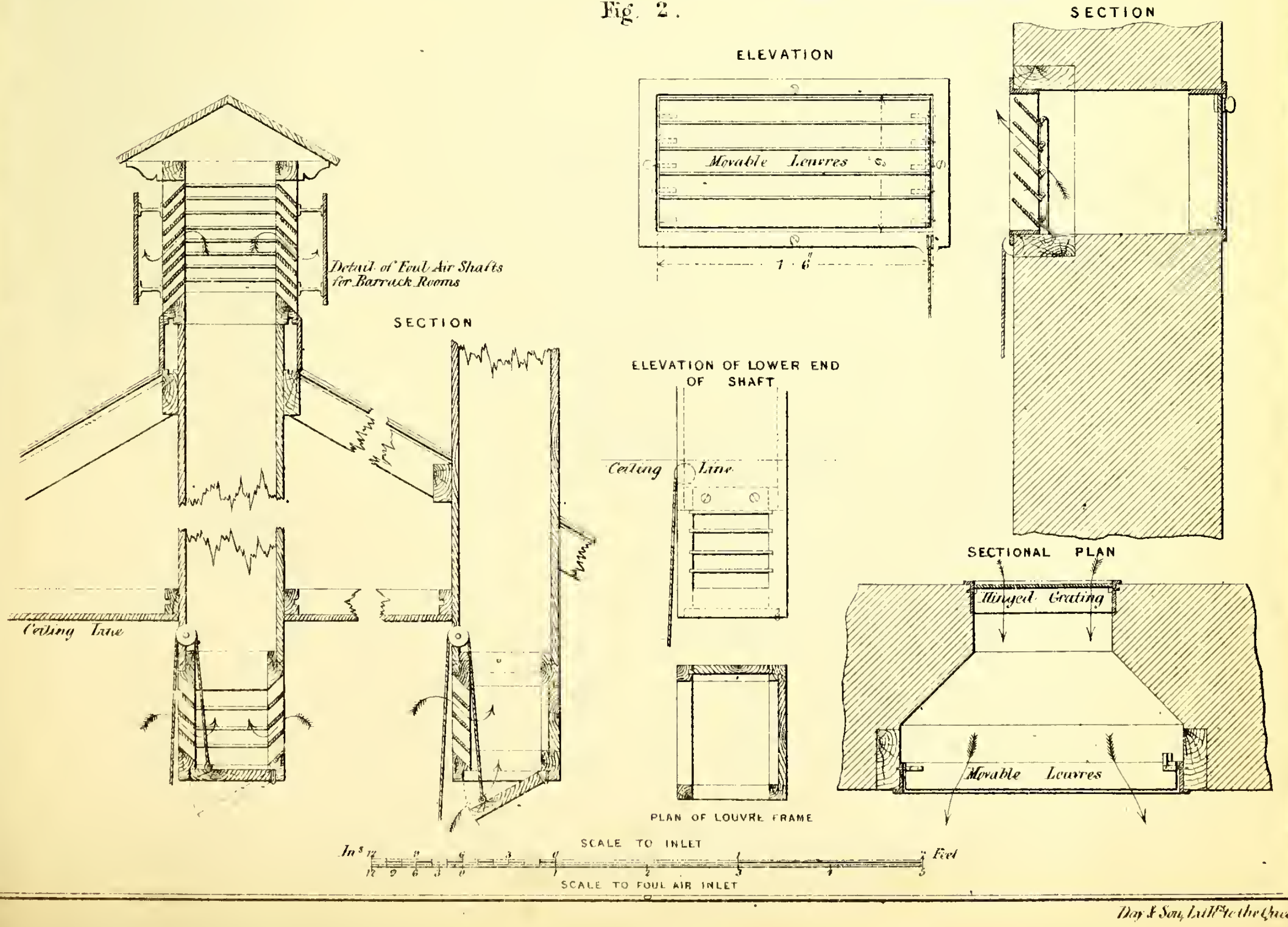
VENTILATING GRATE, FOUL AIR SHAFT &c.

Fig. 1.



Width of Fire Opening			1'·3"
D.º	"	*D.º* "	1'·5"
D.º	"	*D.º* "	1'·9"
Sizes of Stoves		3'·2"	× 3'·6"
D.º	"	*D.º* 3'·4"	× 3'·6"
D.º	"	*D.º* 3'·8"	× 3'·6"

Fig. 2.



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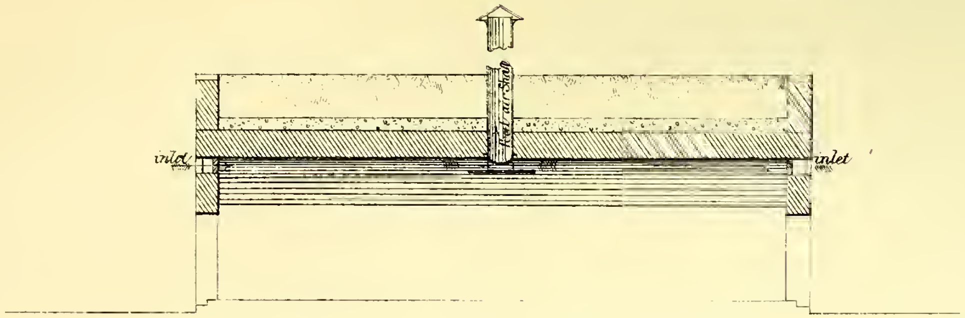
School of Hygiene [illegible] Tropical
LIBRARY
22 AUG 19[illegible]

Plan XL

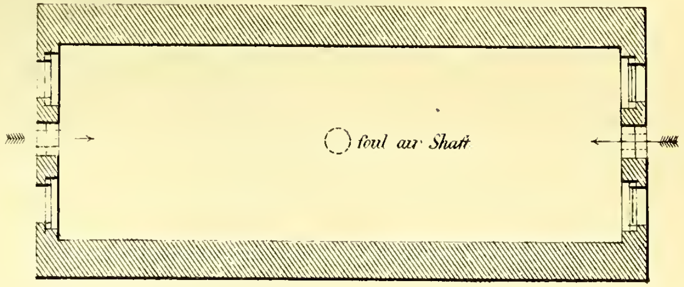
DIAGRAM SHEWING THE METHODS OF VENTILATION TO CASEMATES

Fig. 1.



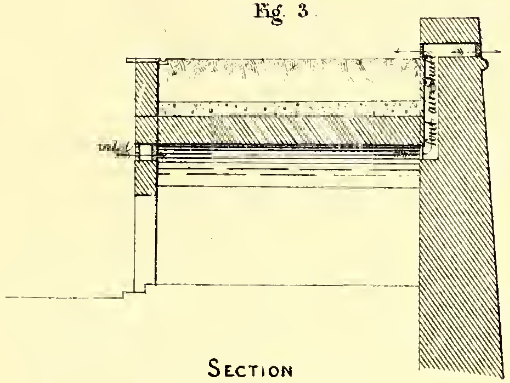
SECTION OF LONG CASEMATE WITH WINDOWS AND DOORS AT OPPOSITE ENDS

Fig. 2.



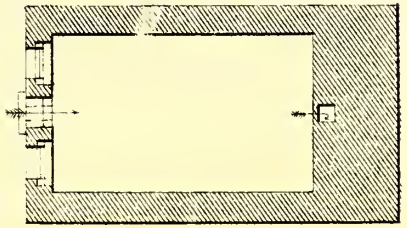
PLAN OF LONG CASEMATE

Fig. 3.



SECTION

CASEMATE WITH ONE END AGAINST DEAD WALL



PLAN

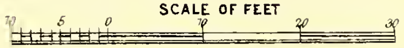
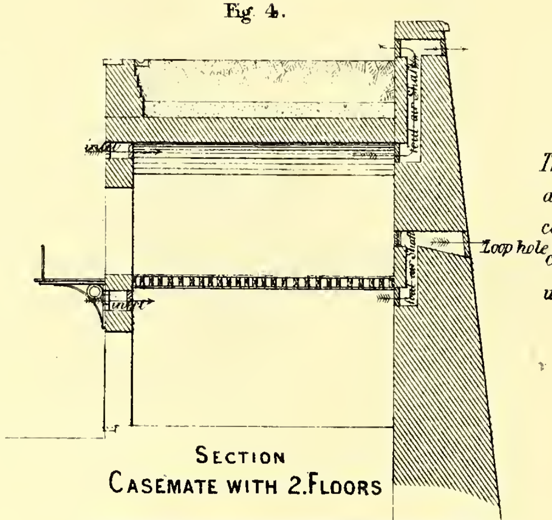


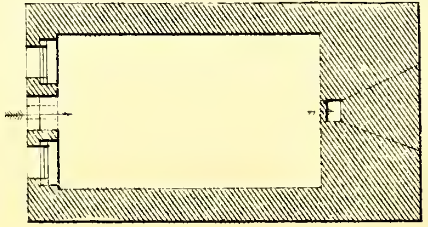
Fig. 4.



This plan may be adopted in existing casemates where shafts cannot be carried up to the parapet

SECTION

CASEMATE WITH 2. FLOORS



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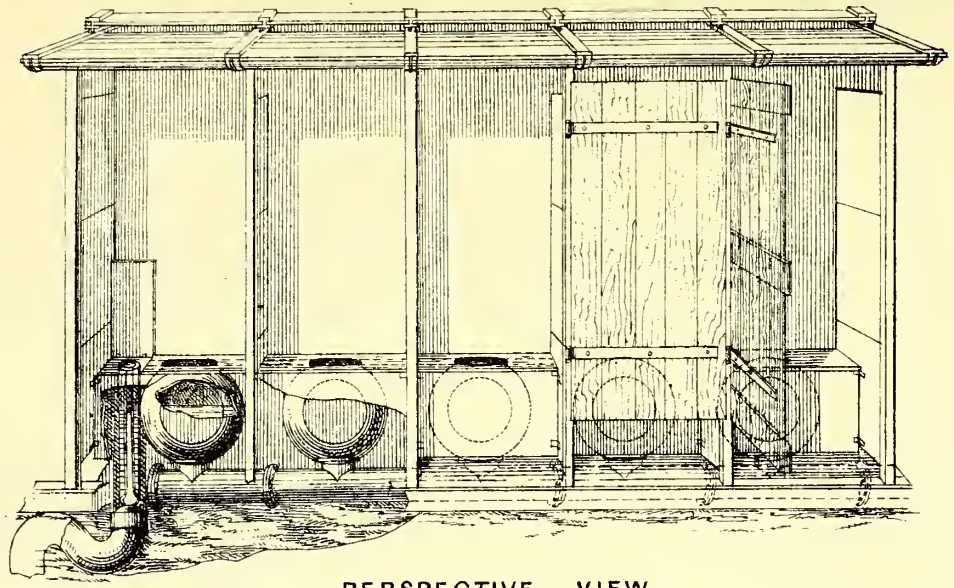
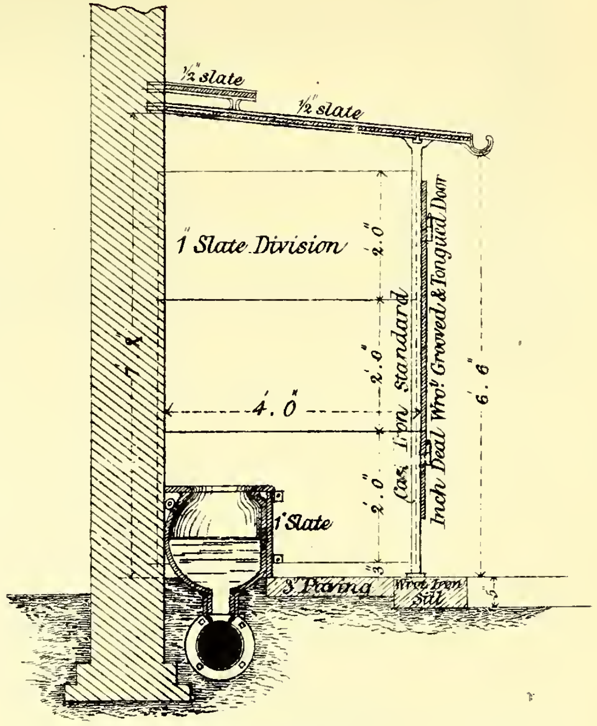
LATRINES

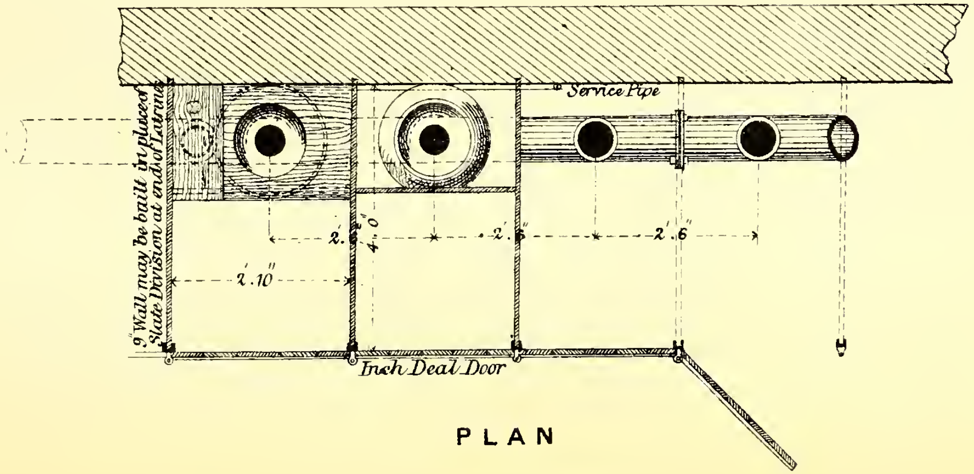
MANUFACTURED BY GEORGE JENNINGS LAMBETH



PERSPECTIVE VIEW

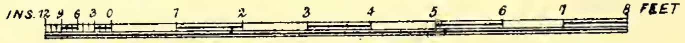


SECTION


Service Pipe
2.6"
2.6"
2.6"
4.0"
2.10"
9" Wall may be built in place of Slate Division at end of Latrines
Inch Deal Door

PLAN

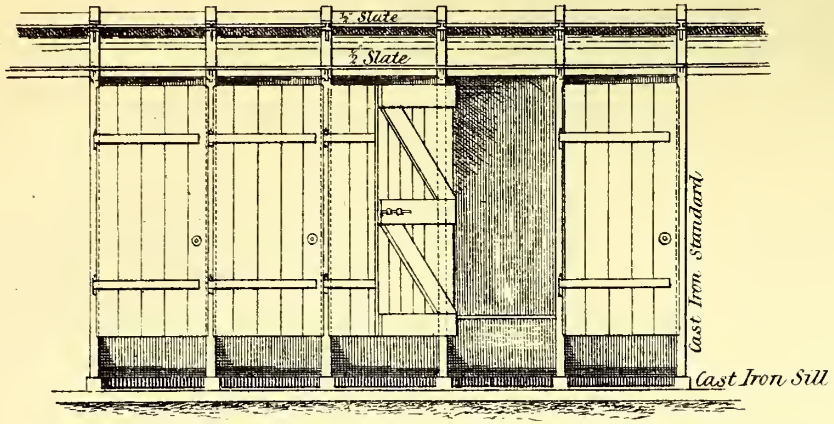
SCALE



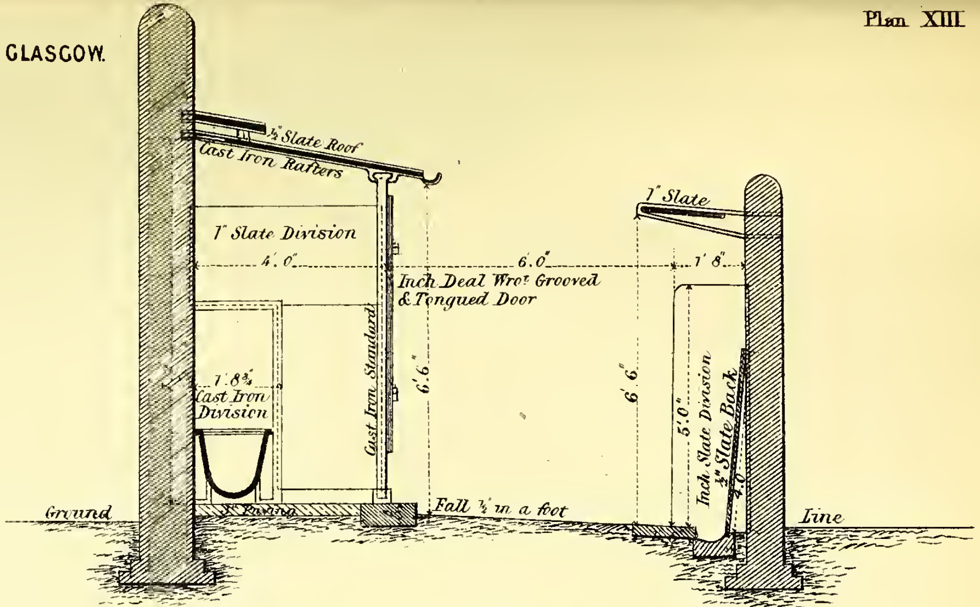
221

LATRINES & URINALS.

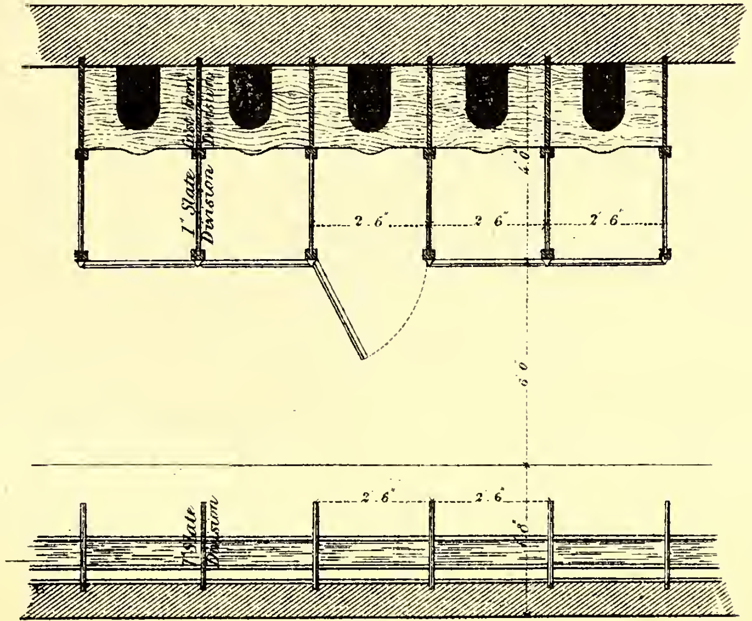
MANUFACTURED BY MACFARLANE & Cº. GLASGOW.



ELEVATION.



SECTION.



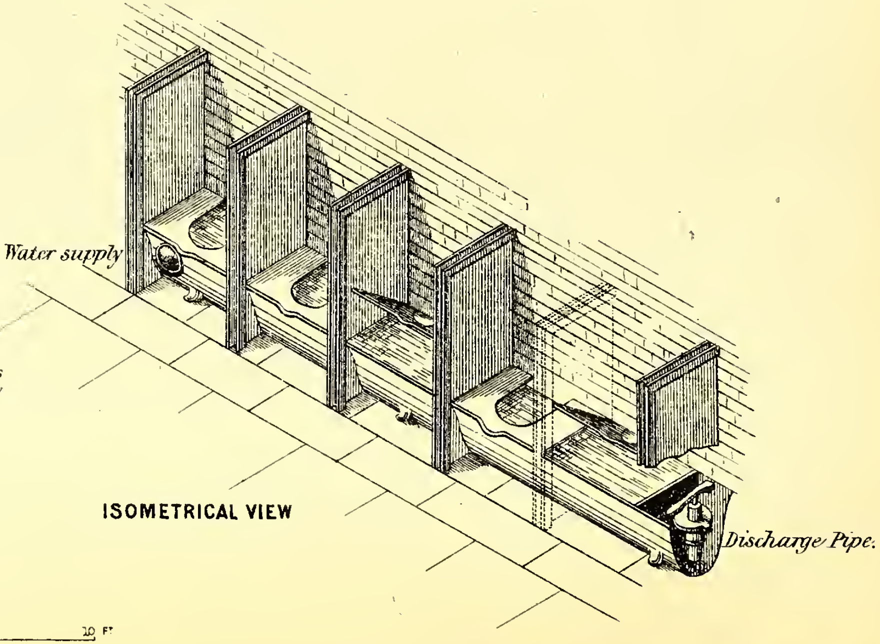
Note, Urinals are not in all cases fixed with Latrines.

PLAN.

Note. The Slate required for Latrines and Urinal is not supplied by Macfarlane & Cº.

SCALE

INS 12 6 0 1 2 3 4 5 10 FT



ISOMETRICAL VIEW

School of
22 AUG 10

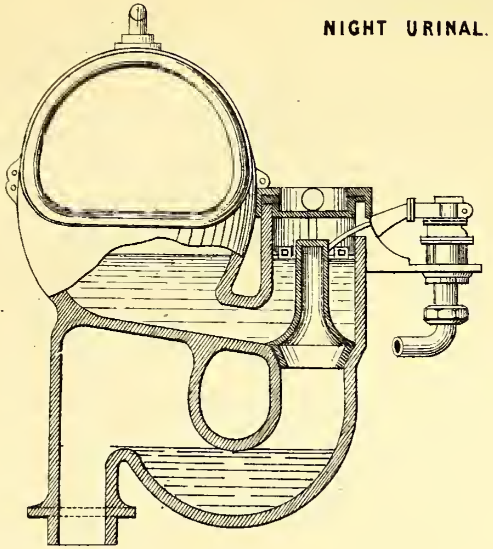
Plan. XIV

URINALS.

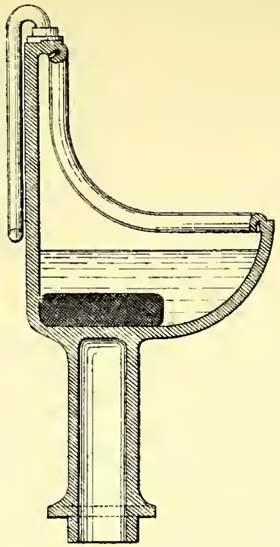
MANUFACTURED BY GEORGE JENNINGS.

LONDON.

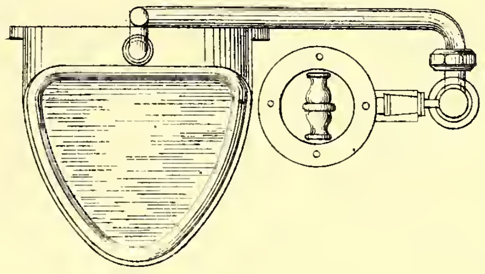
NIGHT URINAL.



FRONT VIEW.

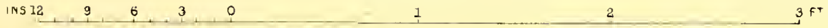


SECTION.

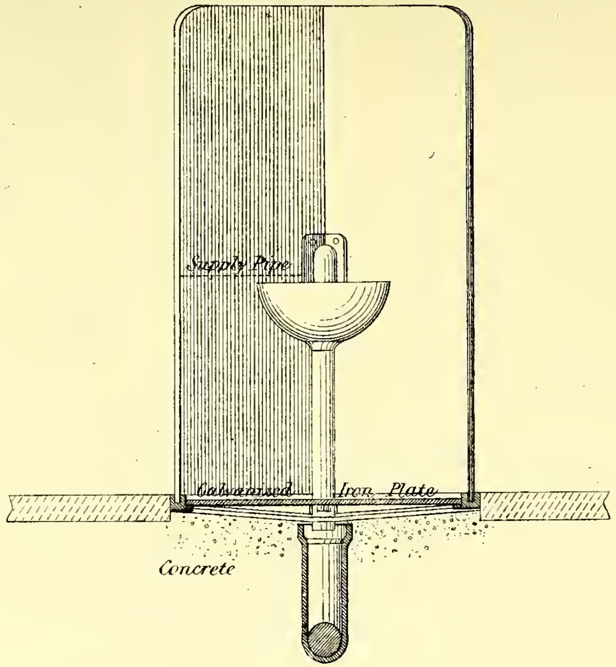


PLAN.

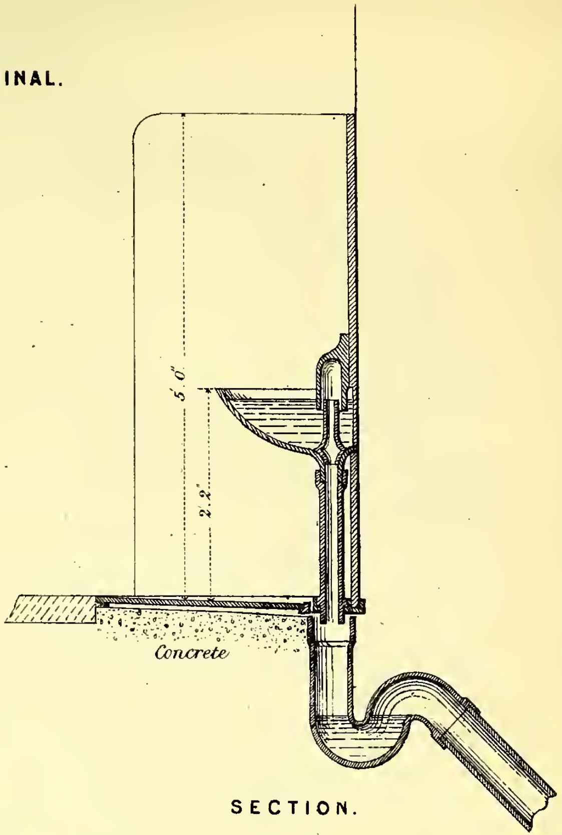
SCALE



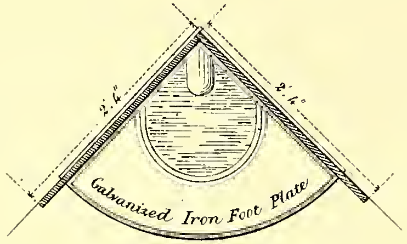
DAY-URINAL.



ELEVATION.



SECTION.



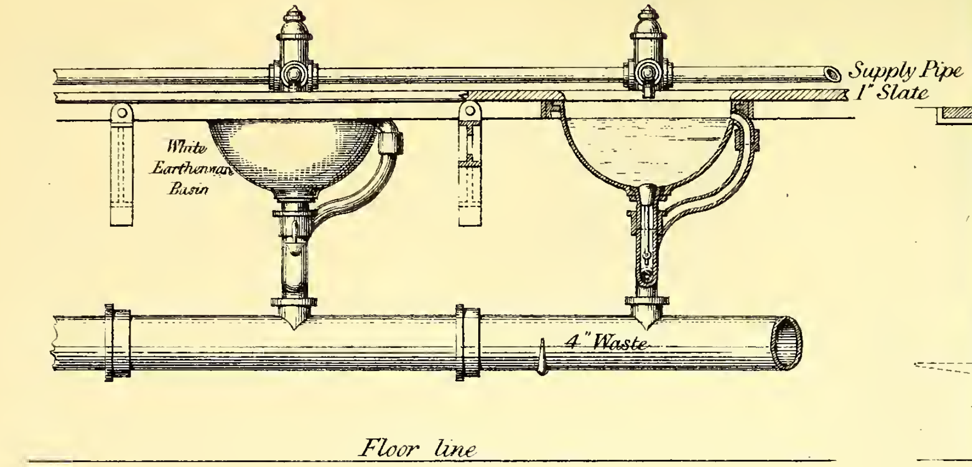
PLAN.

SCALE

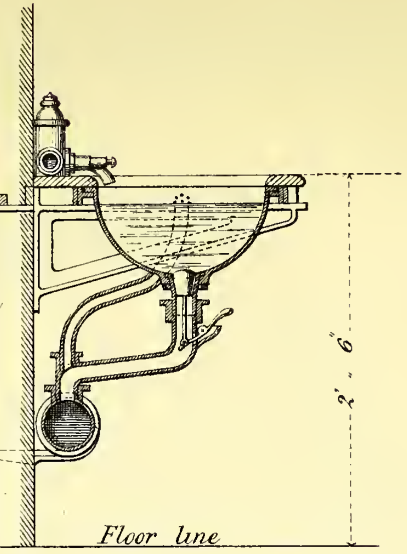
Day & Son Lith^rs. to the Queen

22 AUG 19

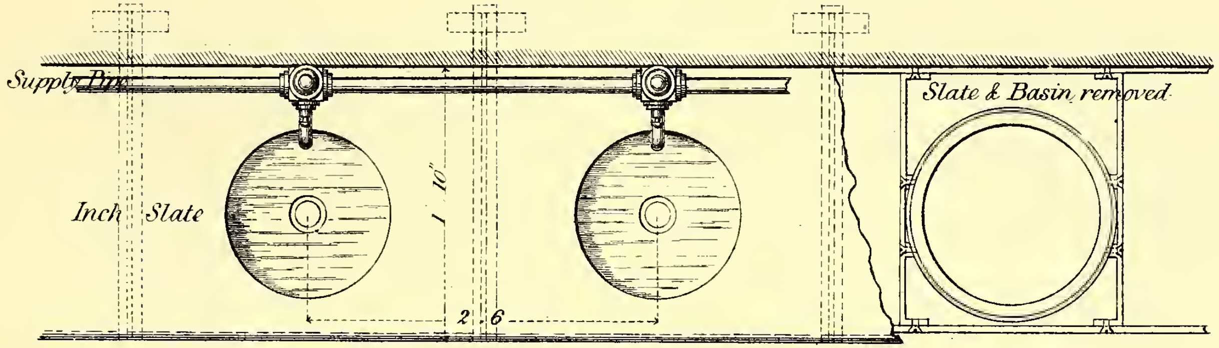
WASHING BASINS



ELEVATION.



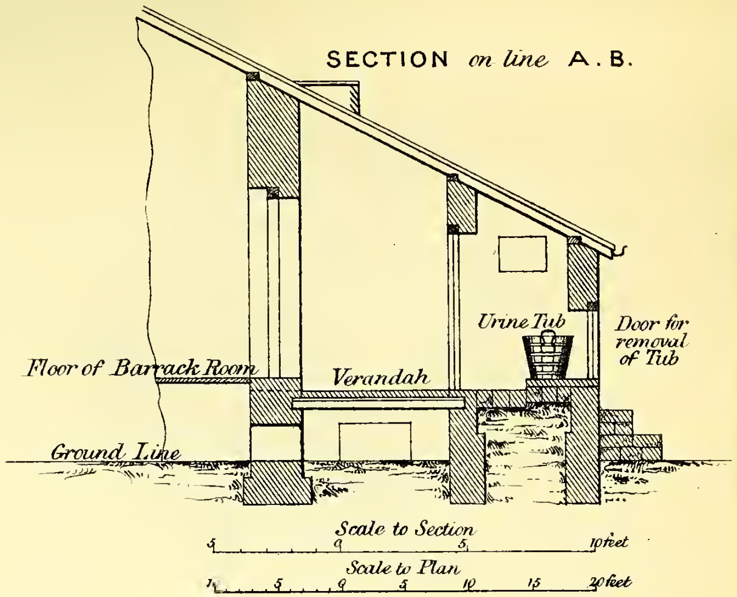
SECTION.

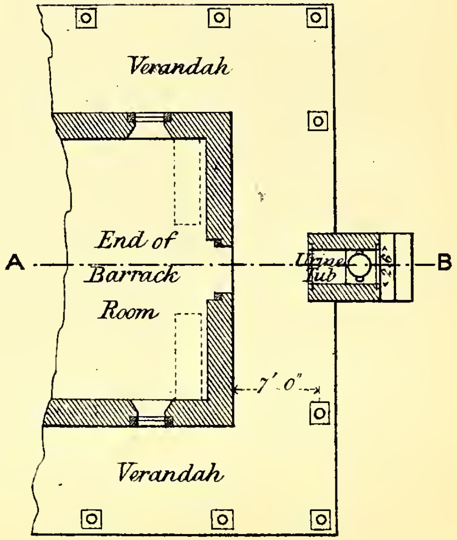


PLAN.

URINE TUB, &c.

SECTION on line A. B.





PLAN
Shewing position of Urine Tub under Verandah

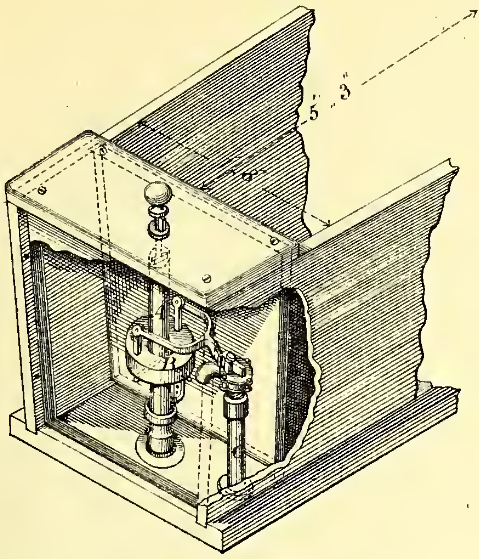
Day & Son, lith. to the Queen

School of
1891

Plan. XVI.

JENNING'S SLATE BATH

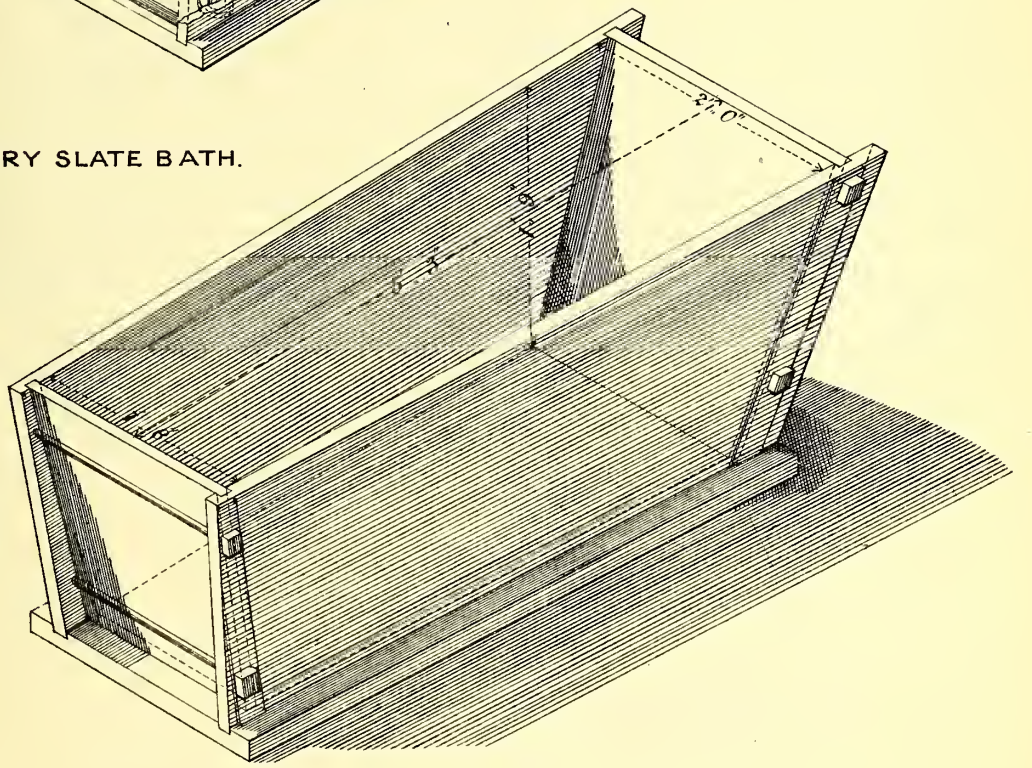
Drawing shewing Supply and Discharge Apparatus.



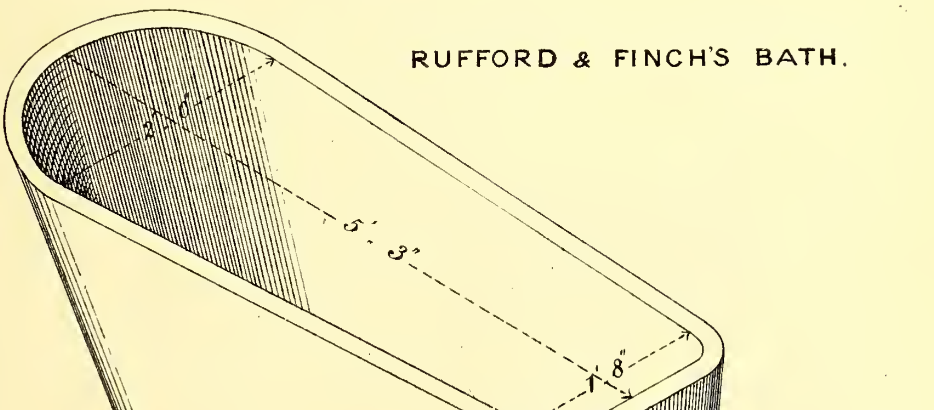
- *A. Hollow Plug & Waste.*
- *B. Float.*
- *C Supply & Hydrostatic Valve. to prevent the Bath being filled beyond 9inches in depth.*

Note. This Bath is of the same internal dimensions as that figured below.

ORDINARY SLATE BATH.



RUFFORD & FINCH'S BATH.

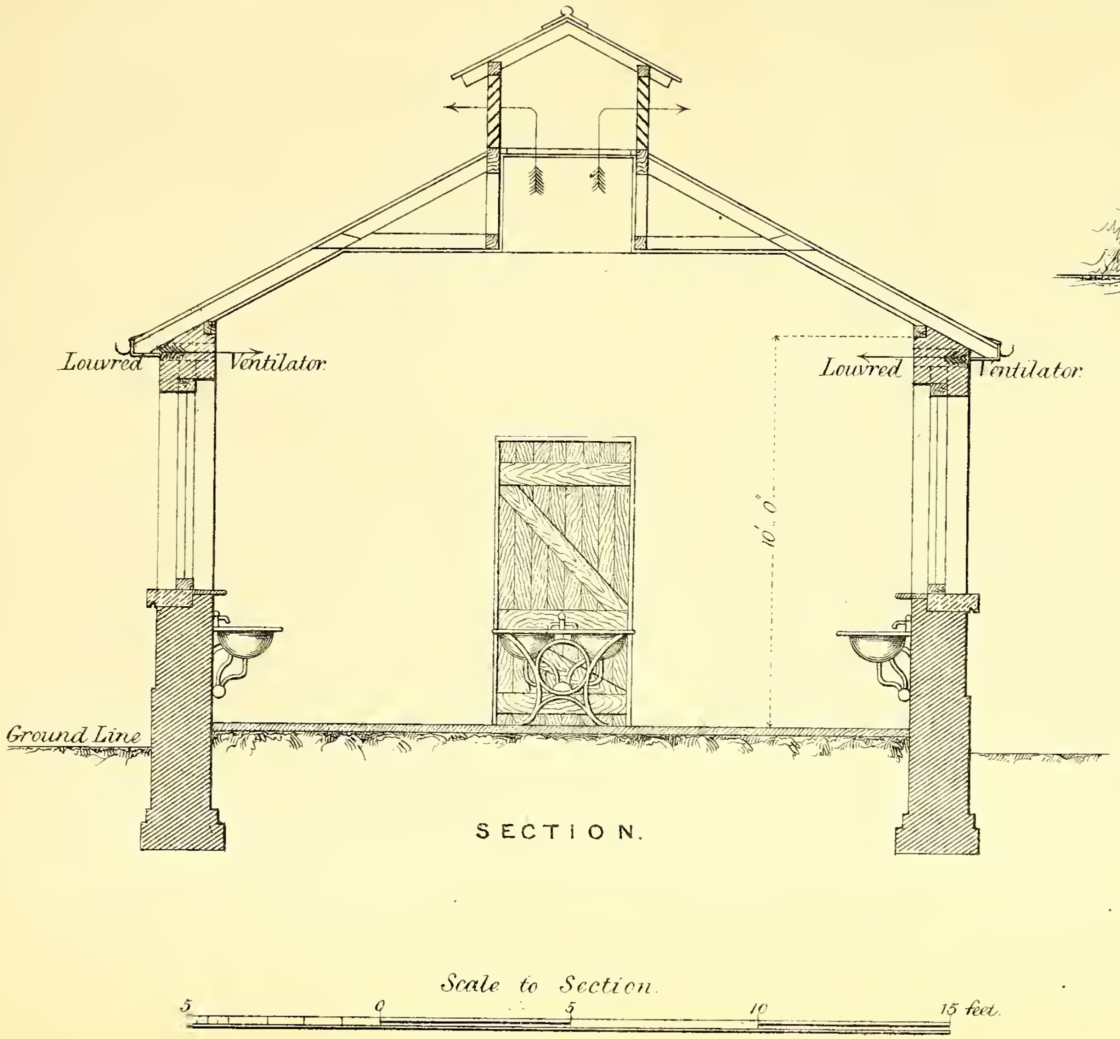


Day & Son, lith. to the Queen.

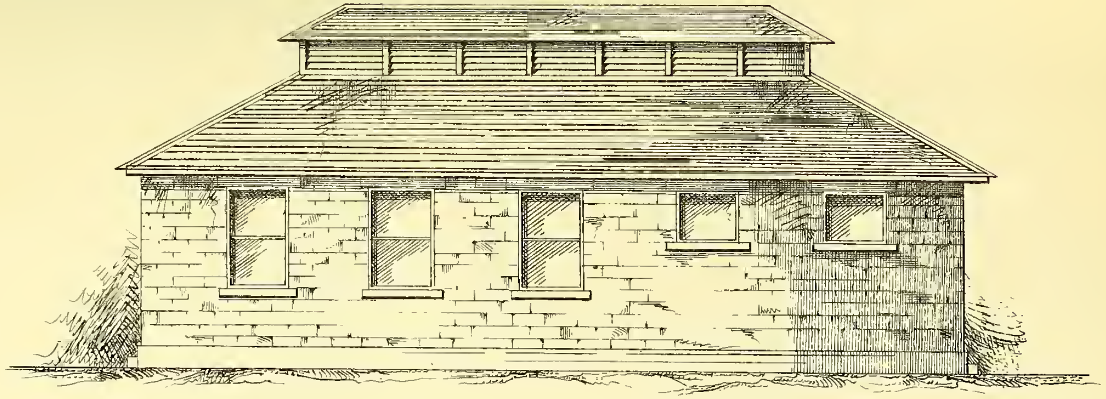
of Physic
22/
ospital

Plan XVII.

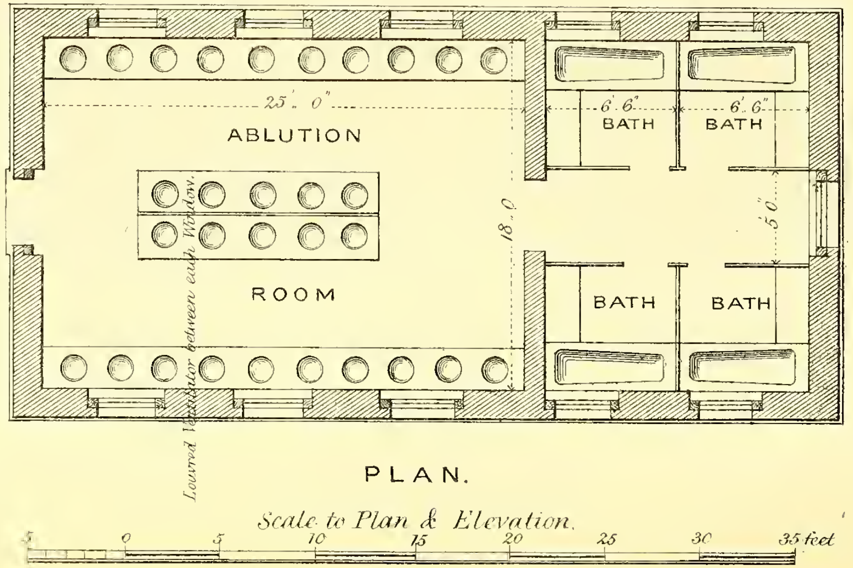
ABLUTION ROOM & BATHS.



SECTION.



ELEVATION.



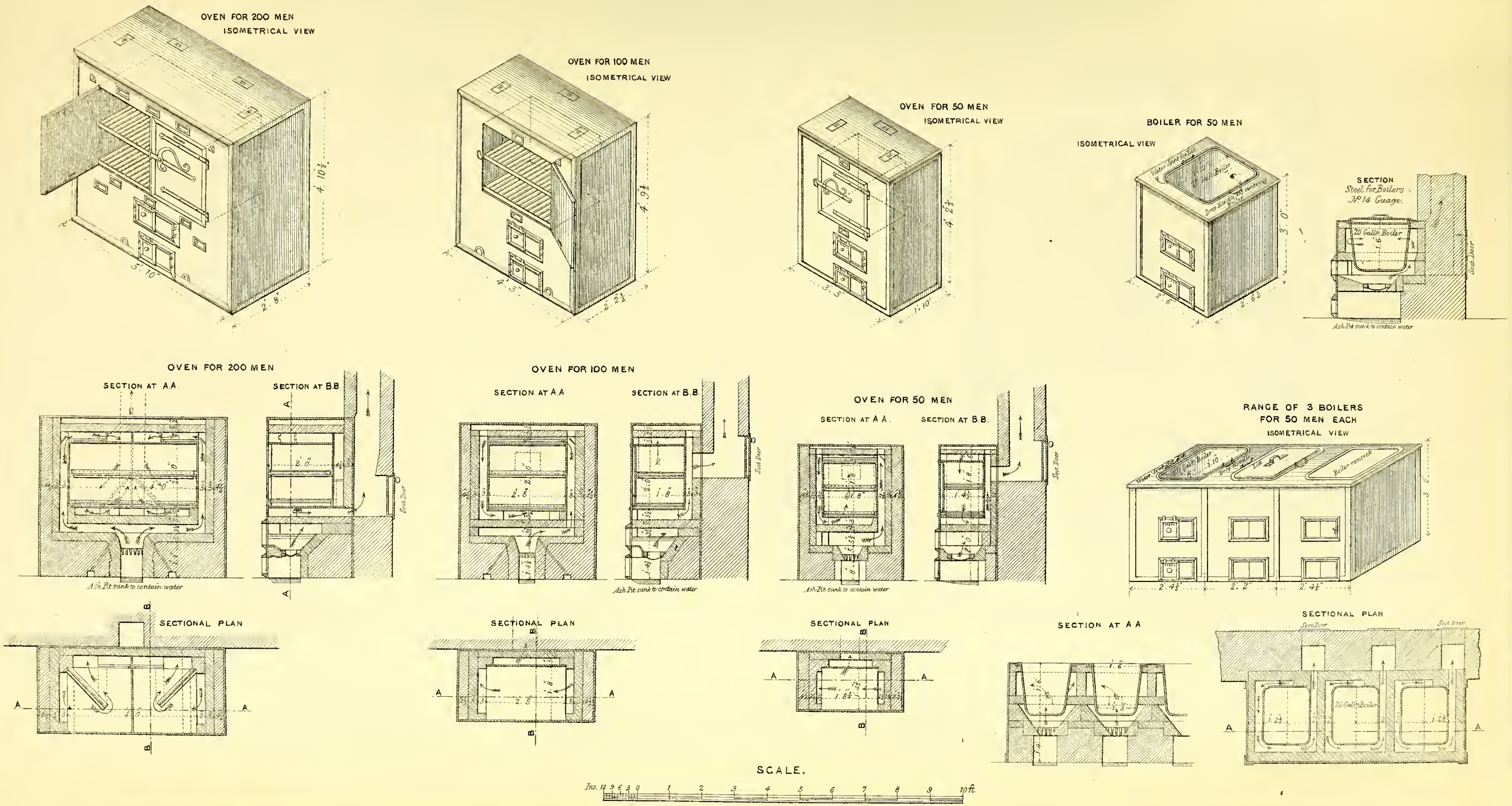
PLAN.

Day & Son, lith. to the Queen.

[illegible] 221 [illegible]

APPROVED PATTERNS OF STEEL COOKING OVENS & BOILERS.

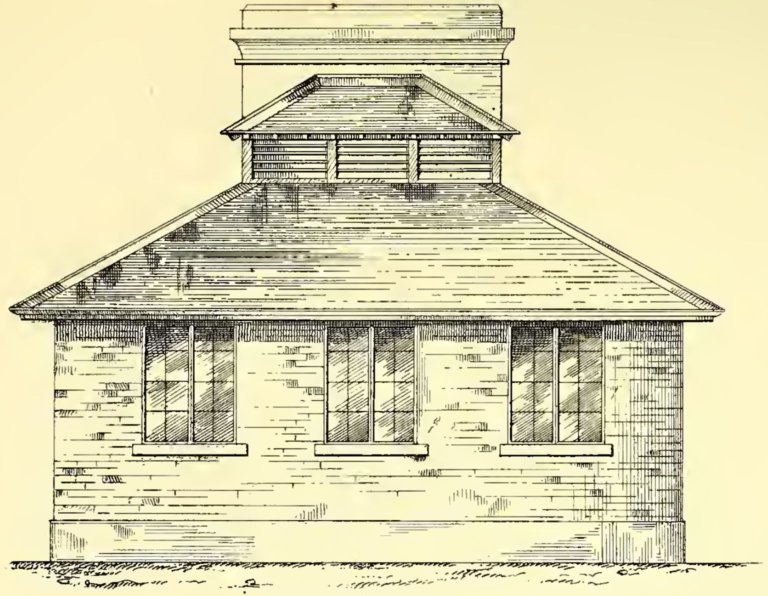
MANUFACTURED BY EDWARD DEANE, 1 ARTHUR STREET EAST, LONDON BRIDGE E.C.



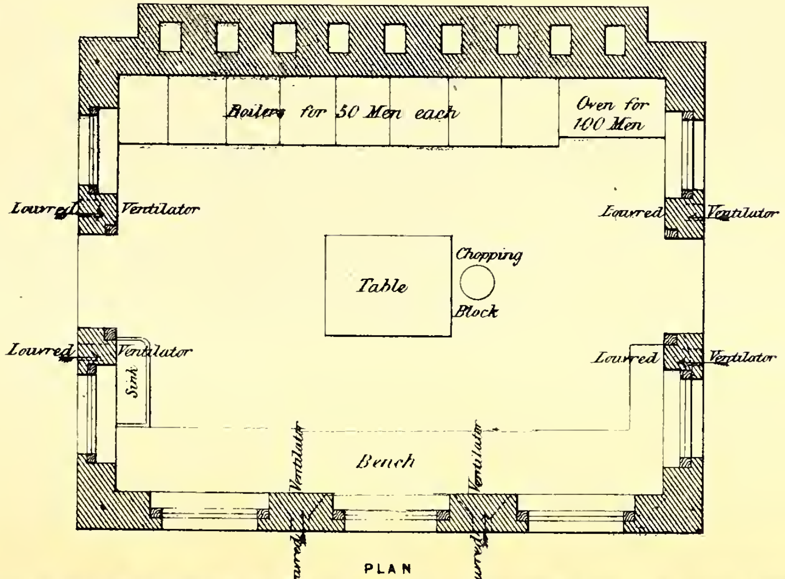
Day & Son, Lithrs to the Queen

School of … Tropical
22 AU…

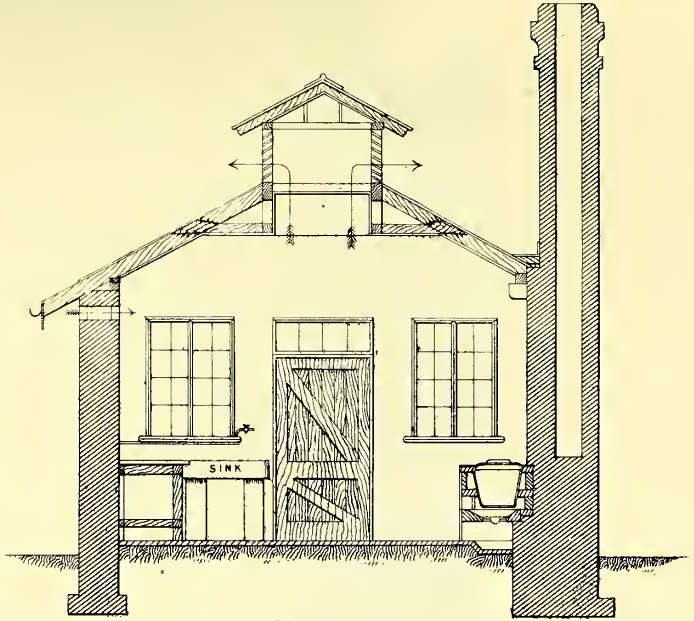
PLAN, ELEVATION & SECTION OF COOKHOUSE.



ELEVATION

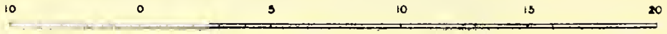


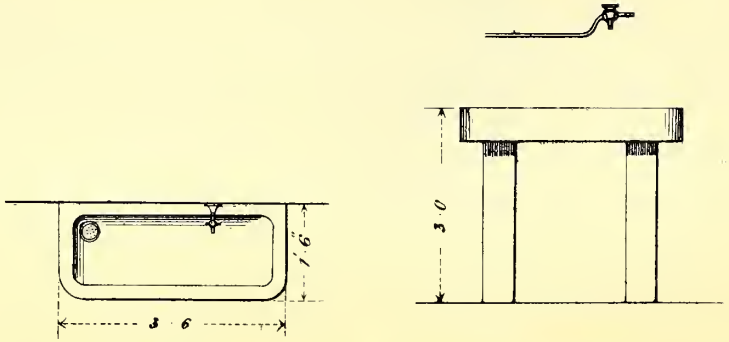
PLAN



SECTION
SHEWING METHOD OF VENTILATION.

SCALE OF FEET FOR PLAN ELEVATION & SECTION





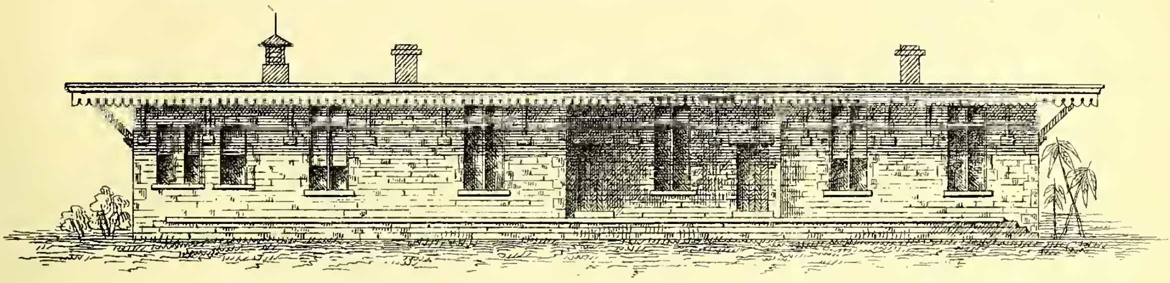
PLAN

ELEVATION

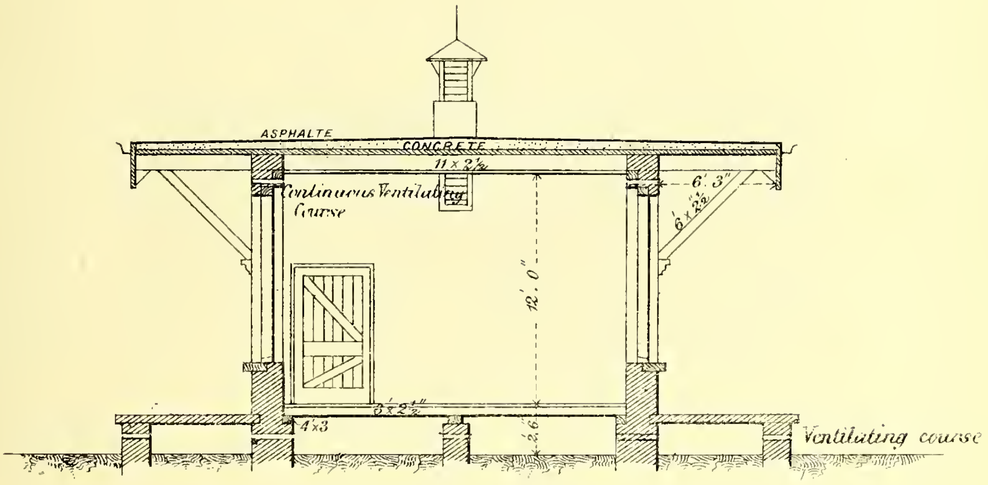
SINK AND WATER SUPPLY.
1/3 inch scale

Day & Son Lithrs to the Queen.

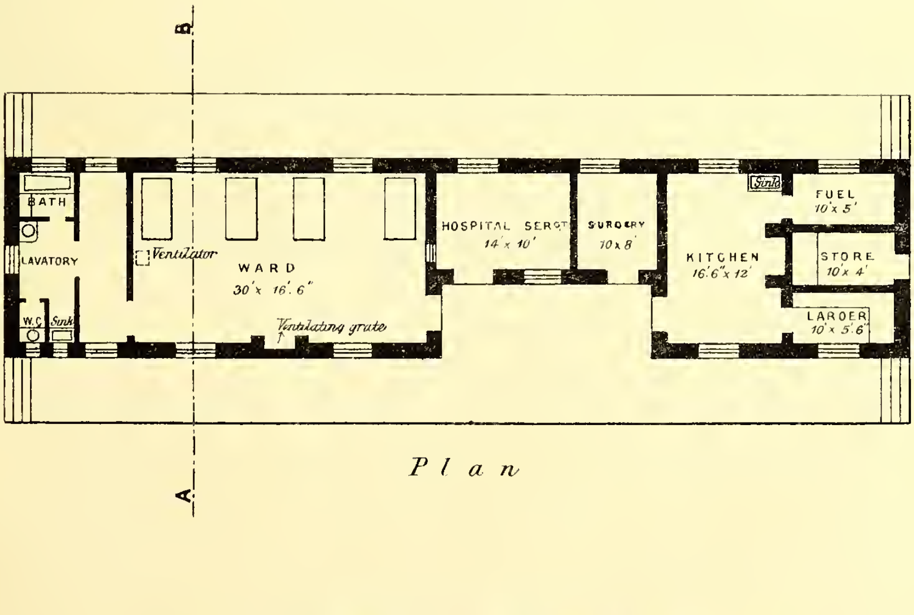
CERIGO
PROPOSED HOSPITAL.



Elevation



Section on the line A.B.



Plan

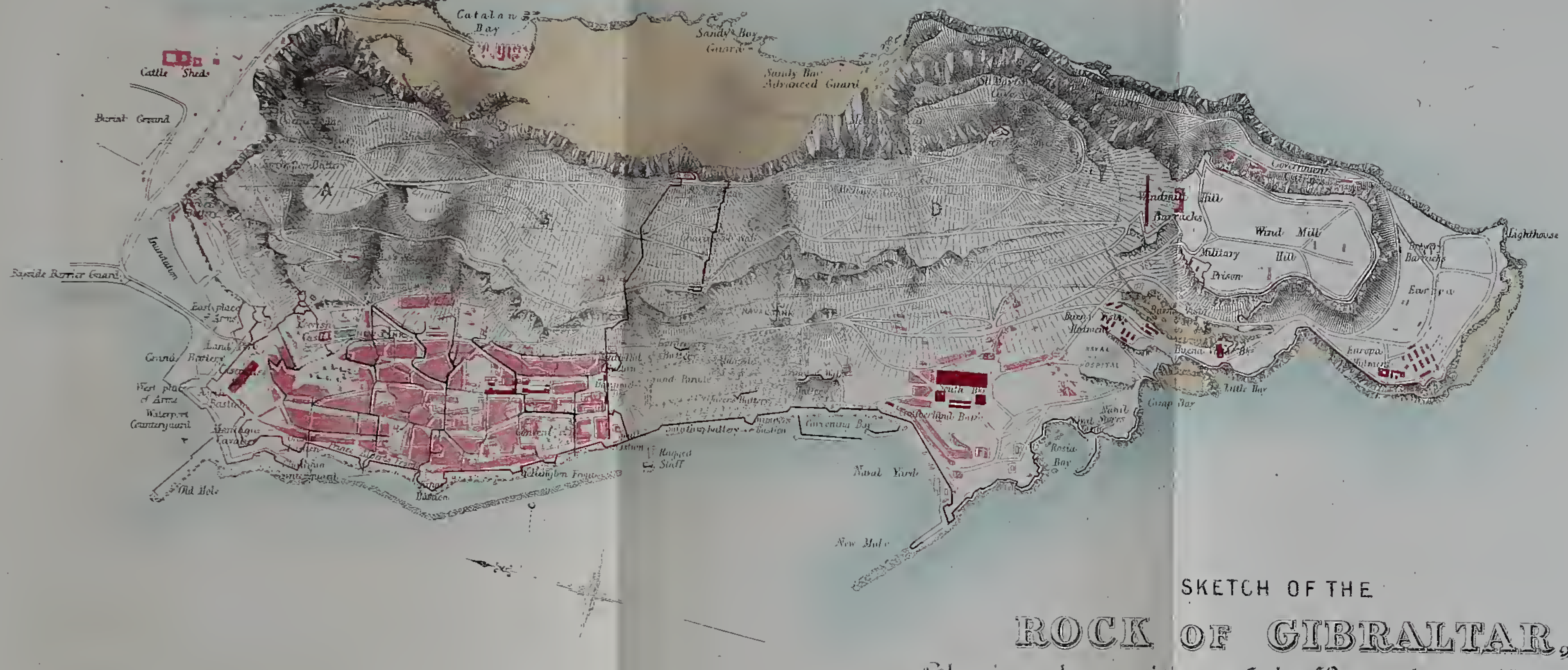
Scale for Plan & Elevation.

Scale for Sections.

Day & Son Lithrs to the Queen.

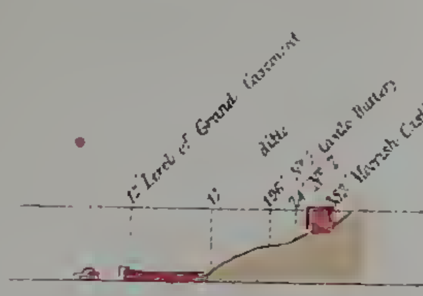
[illegible]

PLAN XXI.

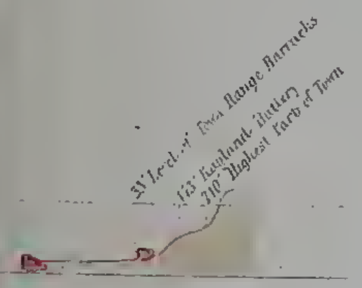


SKETCH OF THE
ROCK OF GIBRALTAR,
Shewing the position of the Barracks & Casemates
AND THE STREETS OF THE TOWN
The Water Tanks and Lines of Sewers & Drains,
AND ALSO
The General Configuration of the Ground.

SECTION ON A B.



SECTION ON C D.



Areas of watershed whence the water supply may be obtained

- A *about 40 acres to supply Tank near Moorish Castle*
- B *about 60 acres to supply the proposed New Tank at Buena Vista*
- C *about 20 acres to supply the Naval Tank (New)*
- D *about 50 acres to supply the proposed New Tank at Buena Vista.*

—— Approximate line of pipe for conveying the water to the Tanks at Buena Vista.

SCALE 1200 FEET TO AN INCH. $\frac{1}{14400}$

1200 900 600 300 0 600 1200 1800 2400 3000 3600 FEET

REDUCED FROM THE $\frac{1}{4800}$ PLAN

& Son, Lithrs to the Queen.

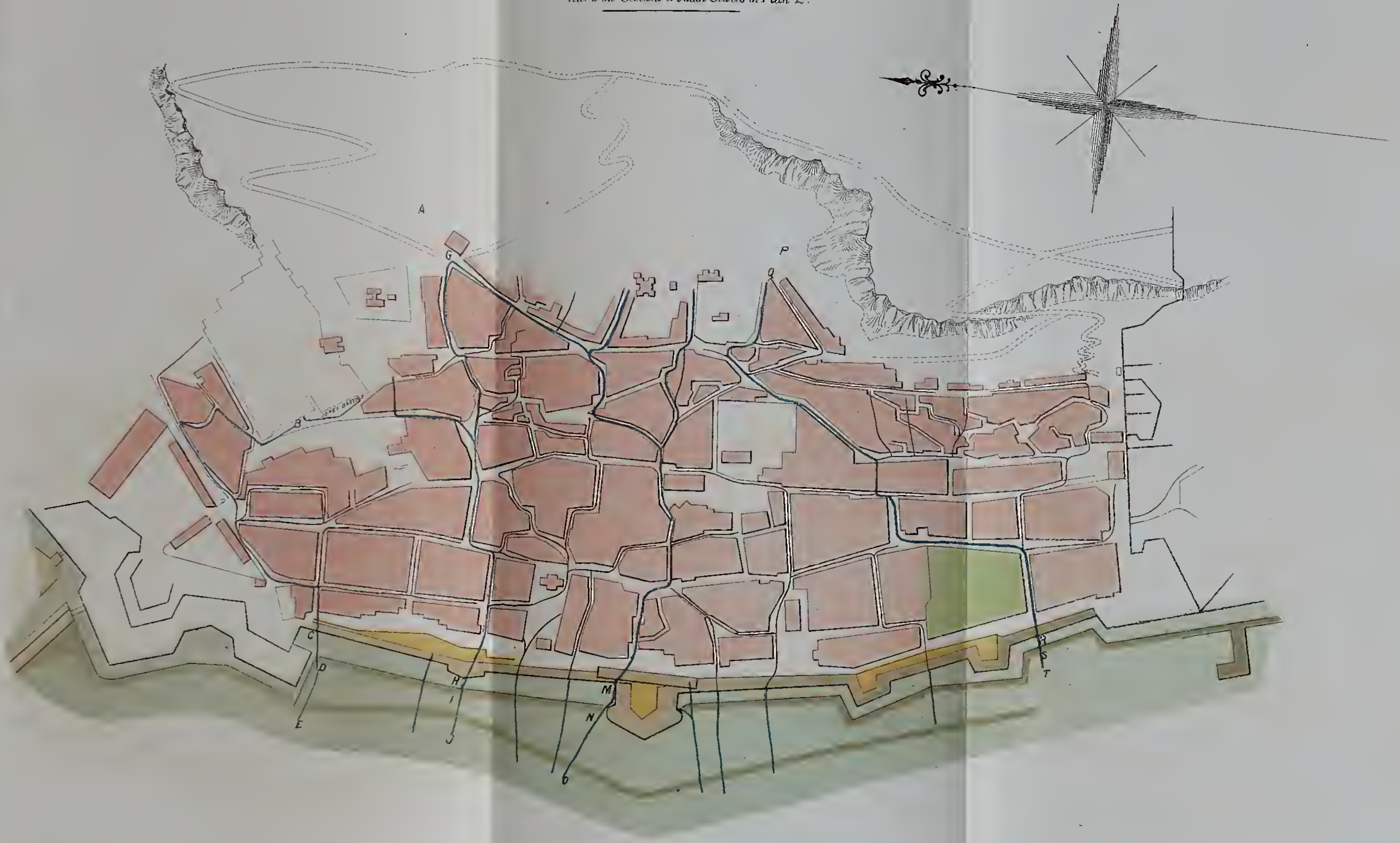
[illegible]

PLAN XXII.

GIBRALTAR

PLAN SHEWING THE EXISTING SYSTEM OF
DRAINS
IN THE CITY.

N.B. The Main Sewers are tinted Blue, the letters refer to the Sections of Main Sewers in Plan 2.



J. L. Watson Lt
25th Regt K.O.B.

Benj. T. Stehelin
Colonel C.R.E.
8th Jany 1862.

Scale 200 feet to an Inch.

100 0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 FEET.

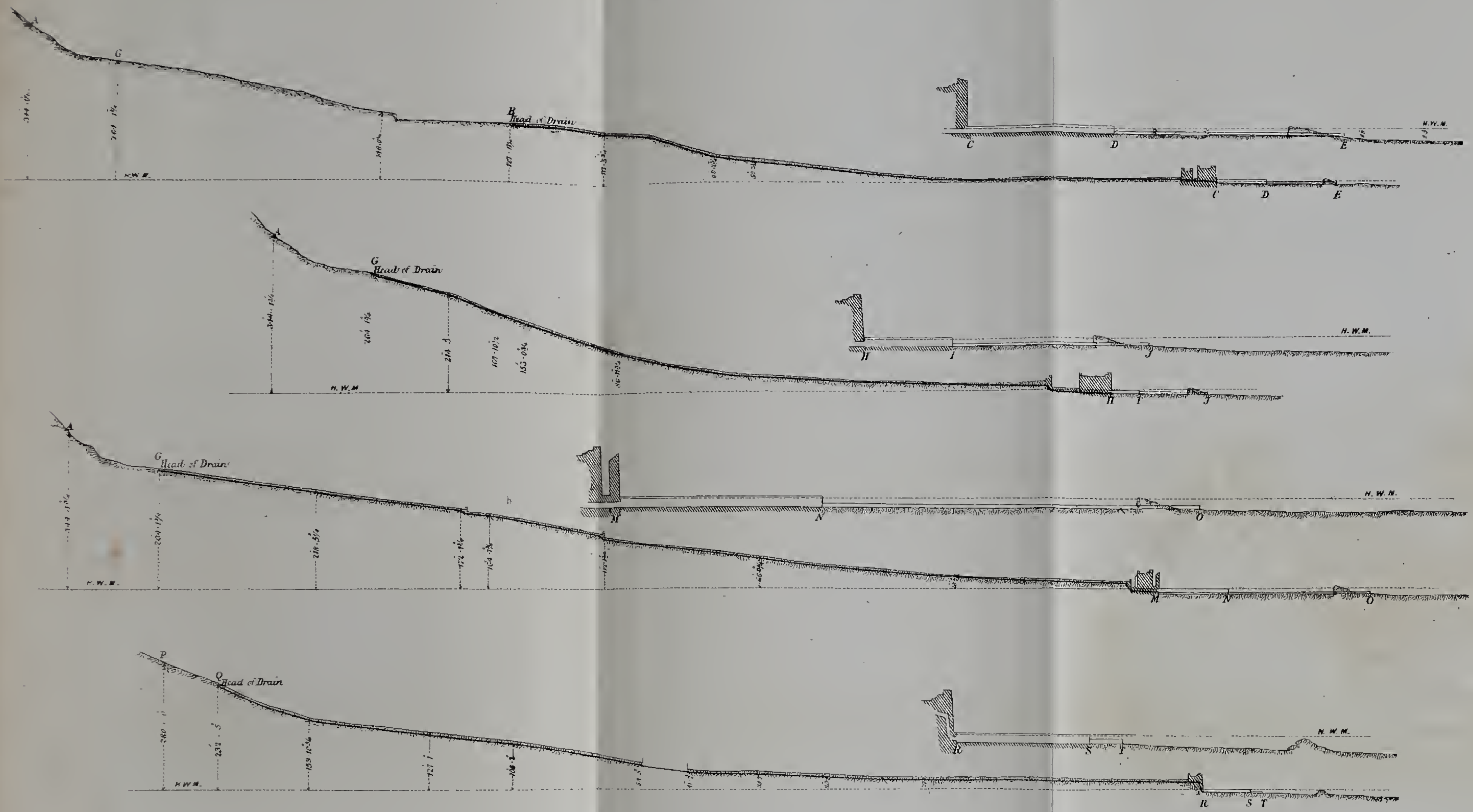
Day & Son, Lithrs to the Queen

giene & Tropical
LIBRARY
20 AUG 192

GIBRALTAR

SECTIONS OF MAIN SEWERS RELATING TO PLAN XXII.

N. B. *The Heights all refer to High Water Mark, which is considered to be 1 foot below the plinth of the Line Wall.*



J L Watson Lt
25th Regt K.O.B.

8th Jan 1862

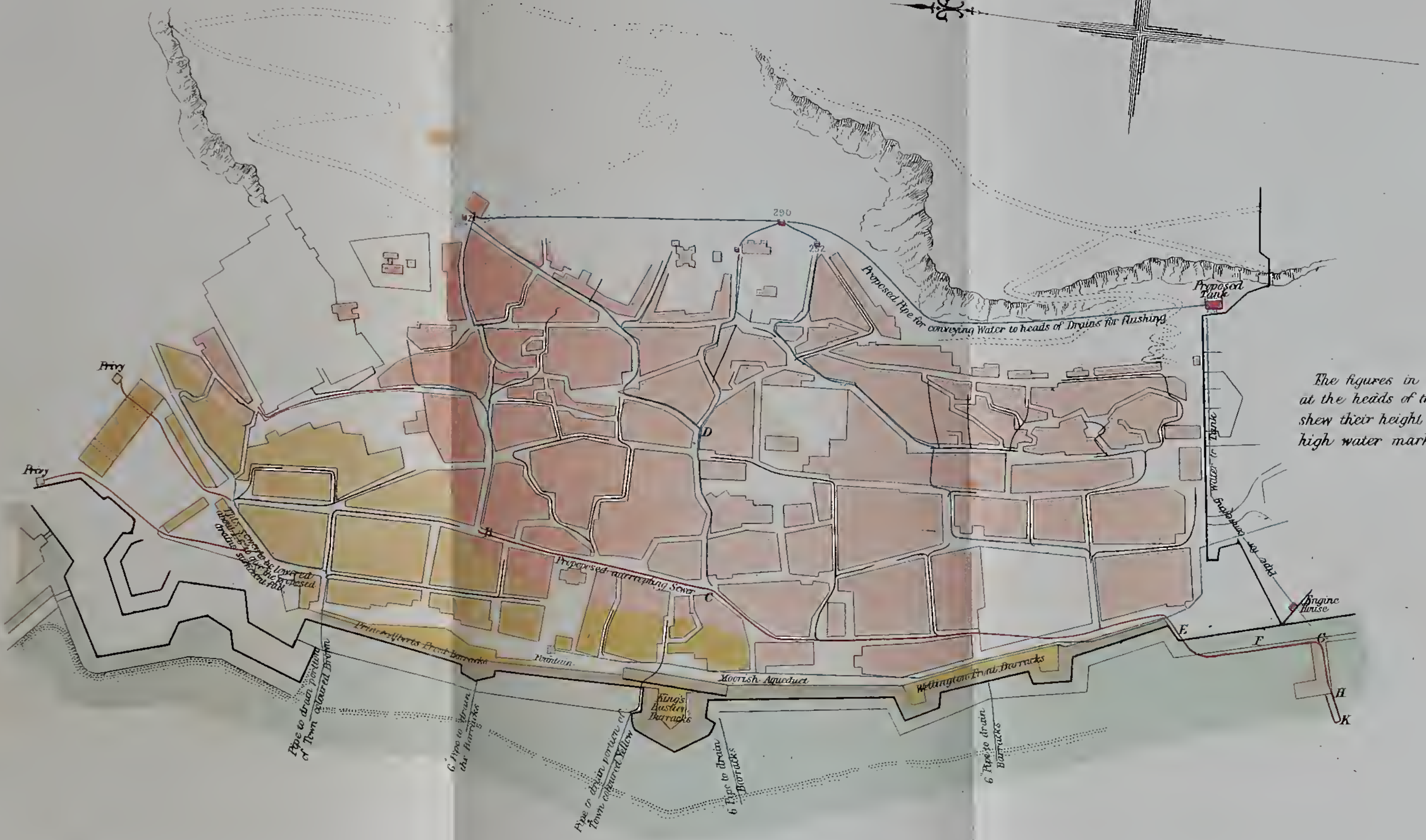
Day & Son, Lithrs to the Queen

22 [illegible]

PLAN XXIV.

GIBRALTAR.

Plan shewing the
PROPOSED SYSTEM OF DRAINAGE IN THE CITY,
also the
PROPOSED MEANS OF FLUSHING THE SEWERS.


290
252
Proposed Pipe for conveying Water to heads of Drains for flushing
Proposed Tank
Pipe for conveying Water to Tank
Engine House
Privy
Privy
This Sewer to be lowered about 1.6 to give the proposed drain sufficient fall
Proposed intercepting Sewer
B
C
D
E
F
G
H
K
Prince Alberts Front Barracks
Fountain
Moorish Aqueduct
King's Bastion Barracks
Wellington Front Barracks
Pipe to drain portion of Town coloured Brown
6" Pipe to drain the Barracks
Pipe to drain portion of Town coloured Yellow
6 Pipe to drain Barracks
6" Pipe to drain Barracks

The figures in blue at the heads of the Sewers shew their height above high water mark.

Scale of 400 Feet to One Inch.

100 50 0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500

J. L. Watson Lt.
25th Regt. K.O.B.

Benj. T. Stehelin
Colonel C.R.E.
8th Jan. 1862.

of Hygiene & Tropical Med
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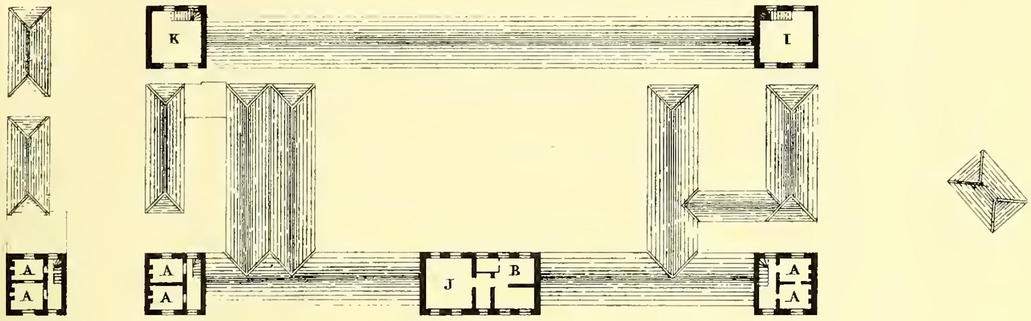
22 AUG. 192[illegible]

Plan No. XXV.

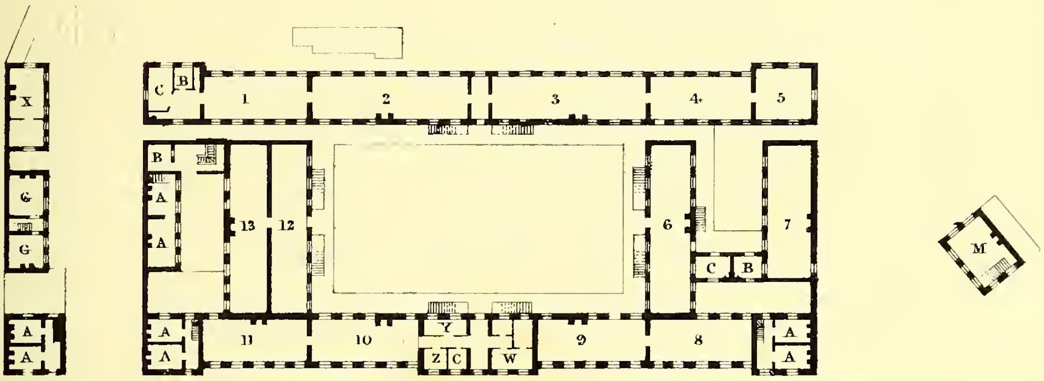
GIBRALTAR.

NAVAL HOSPITAL.

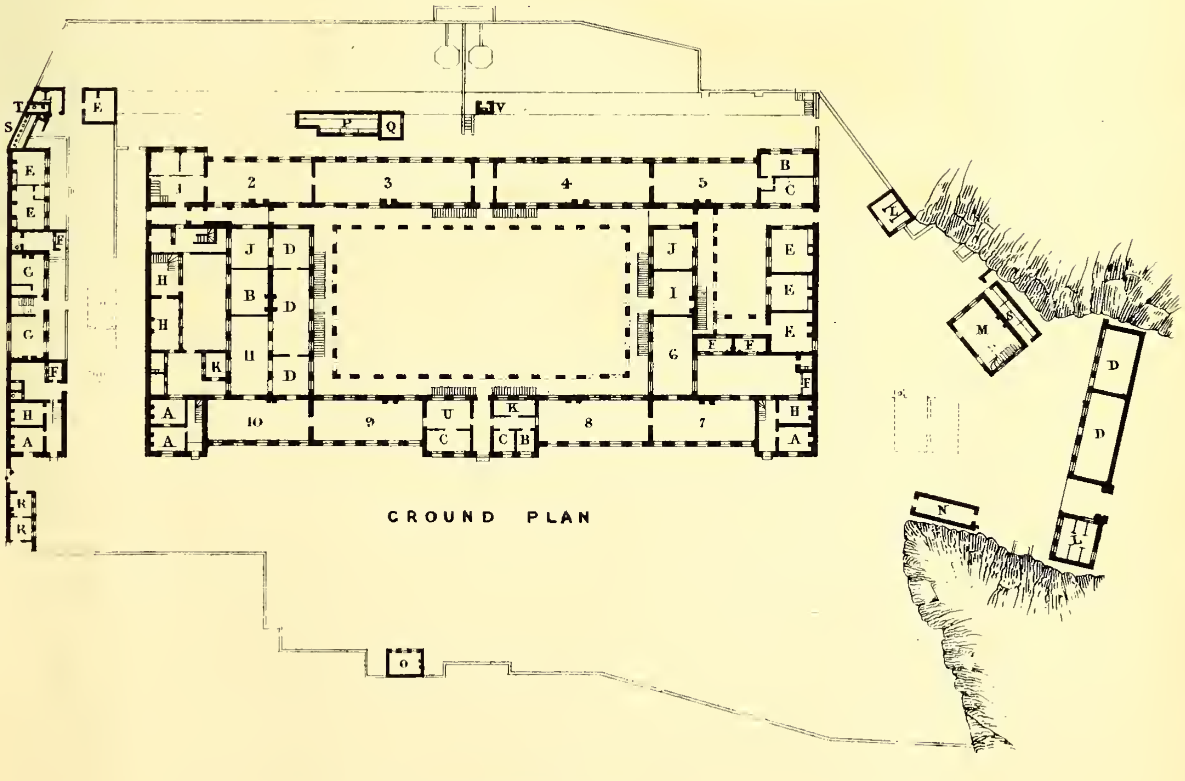
As at present existing



SECOND FLOOR PLAN.

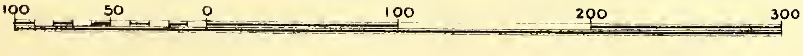


FIRST FLOOR PLAN



GROUND PLAN

SCALE OF FEET



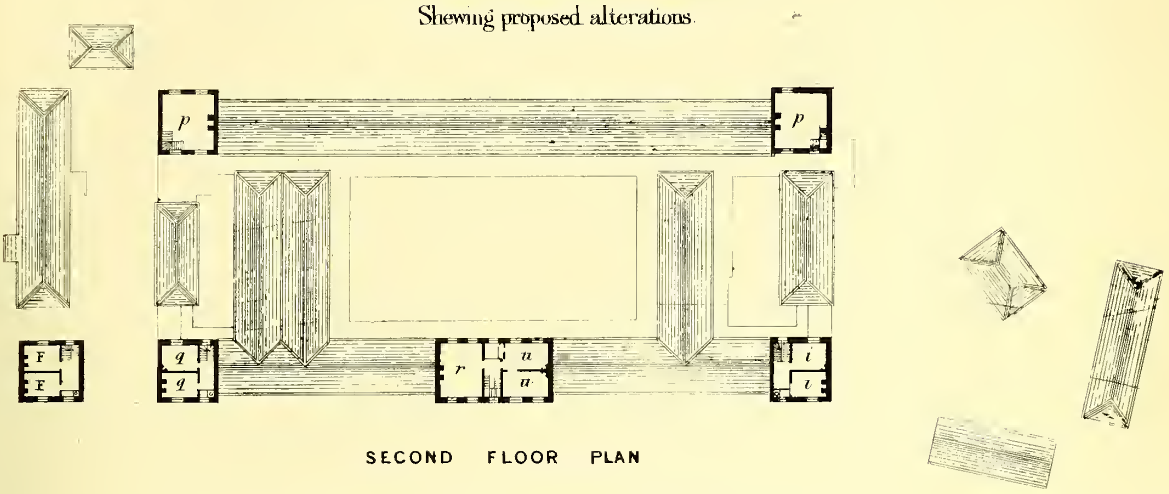
Day & Son, Lith^rs to the Queen

Plan No. XXVI.

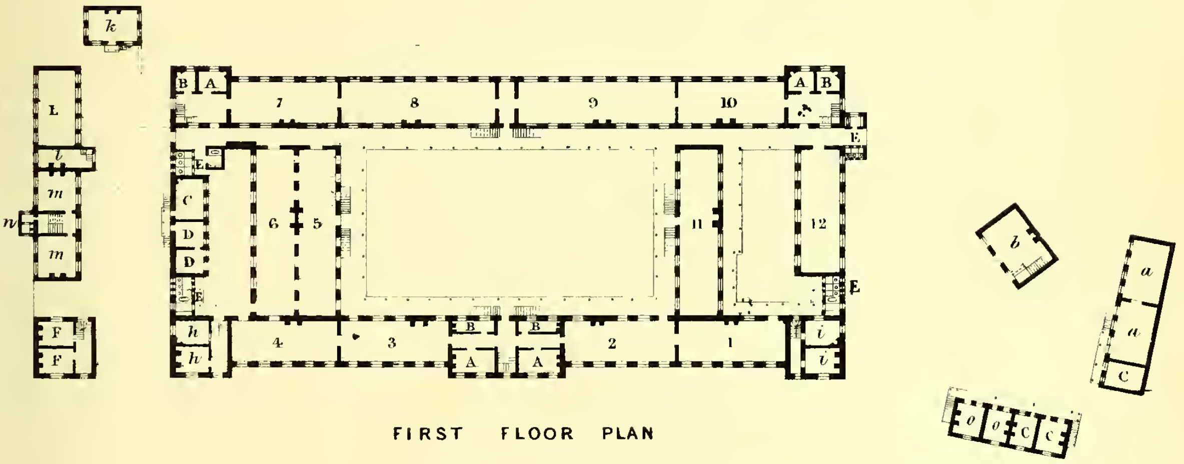
GIBRALTAR.

NAVAL HOSPITAL.

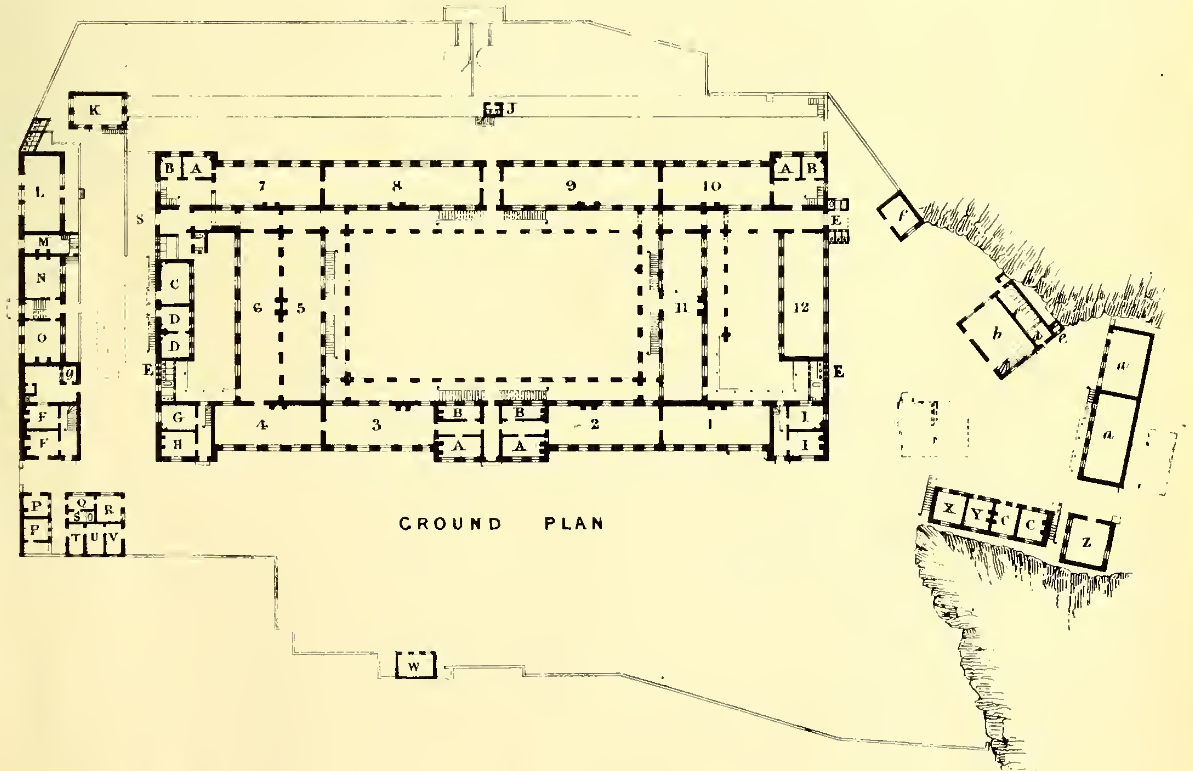
Shewing proposed alterations.



SECOND FLOOR PLAN

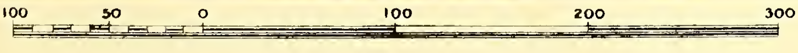


FIRST FLOOR PLAN



GROUND PLAN

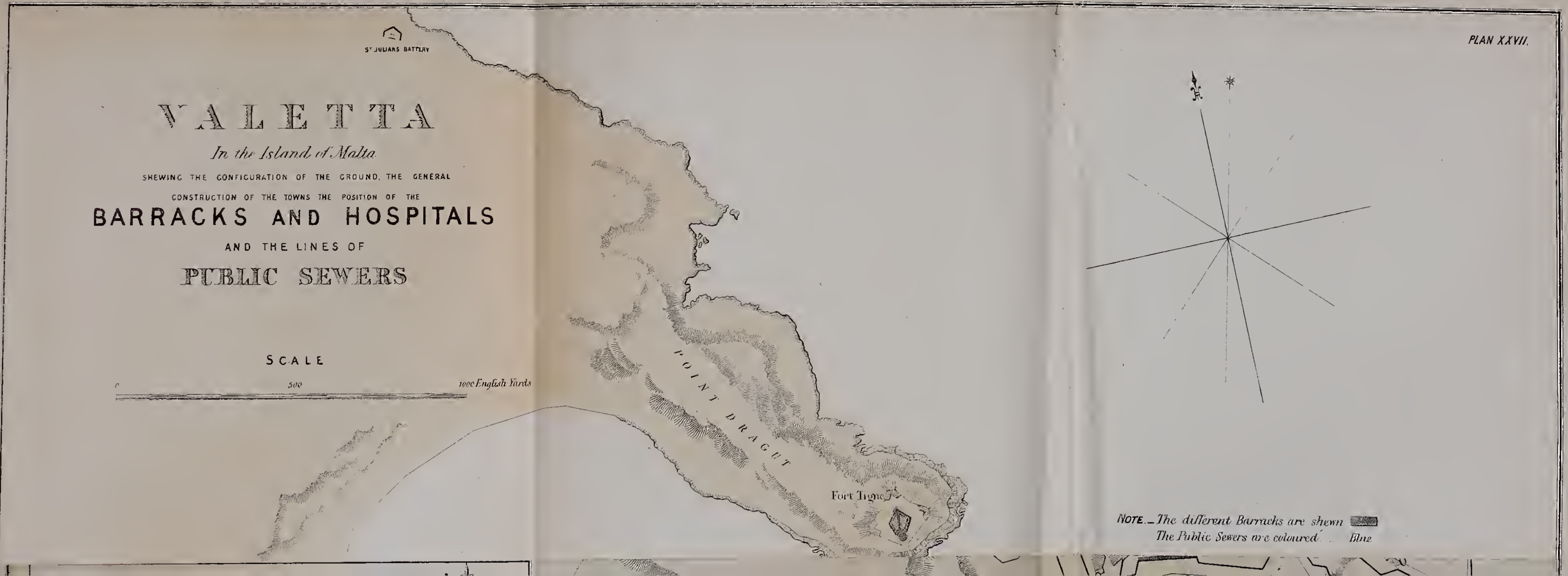
SCALE OF FEET



L.T.

Day & Son, Lith^rs to the Queen

22 [illegible]



PLAN XXVII.

VALETTA

In the Island of Malta

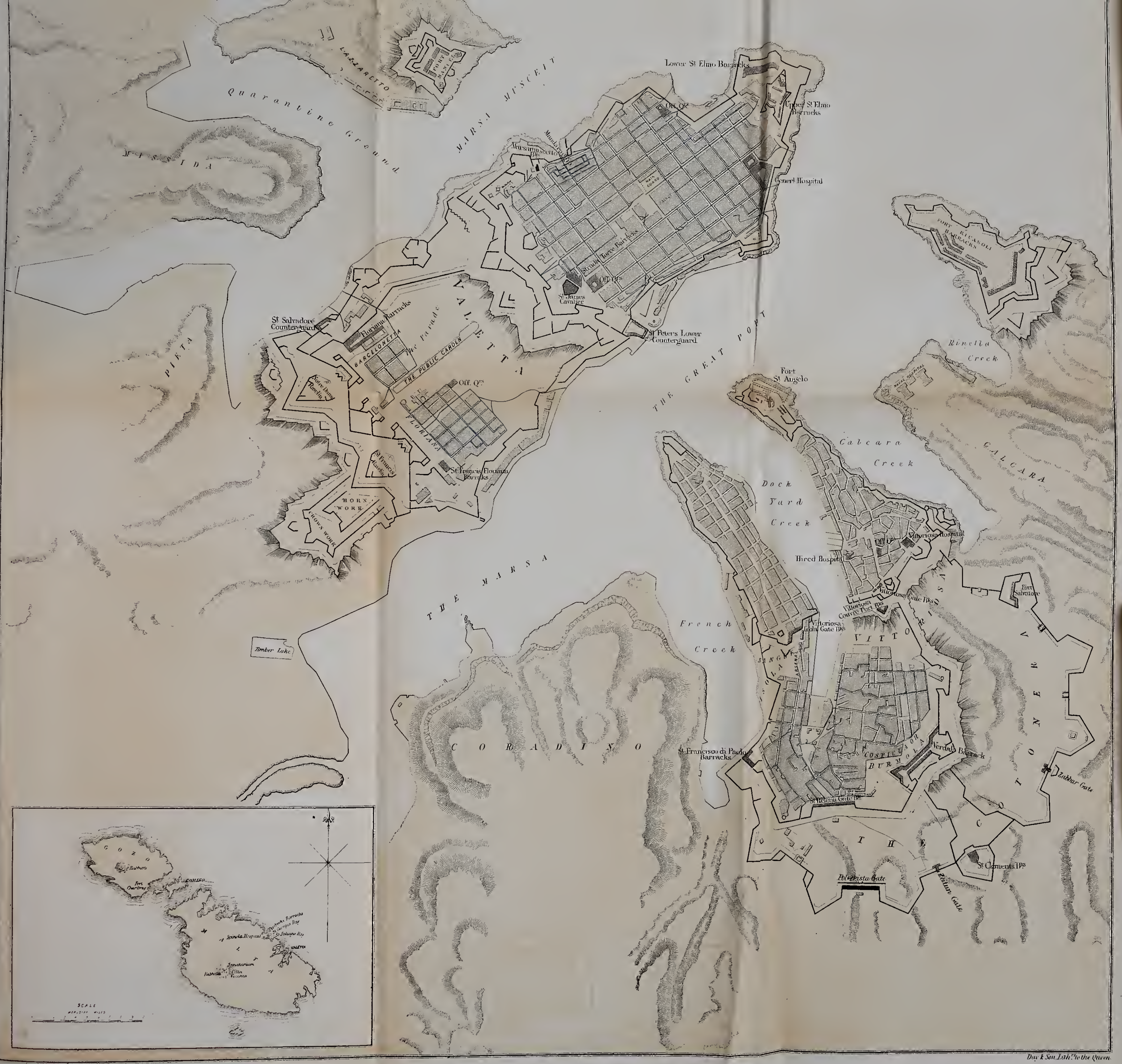
SHEWING THE CONFIGURATION OF THE GROUND, THE GENERAL
CONSTRUCTION OF THE TOWNS THE POSITION OF THE

BARRACKS AND HOSPITALS

AND THE LINES OF

PUBLIC SEWERS

NOTE._The different Barracks are shewn ▨
The Public Sewers are coloured ... Blue



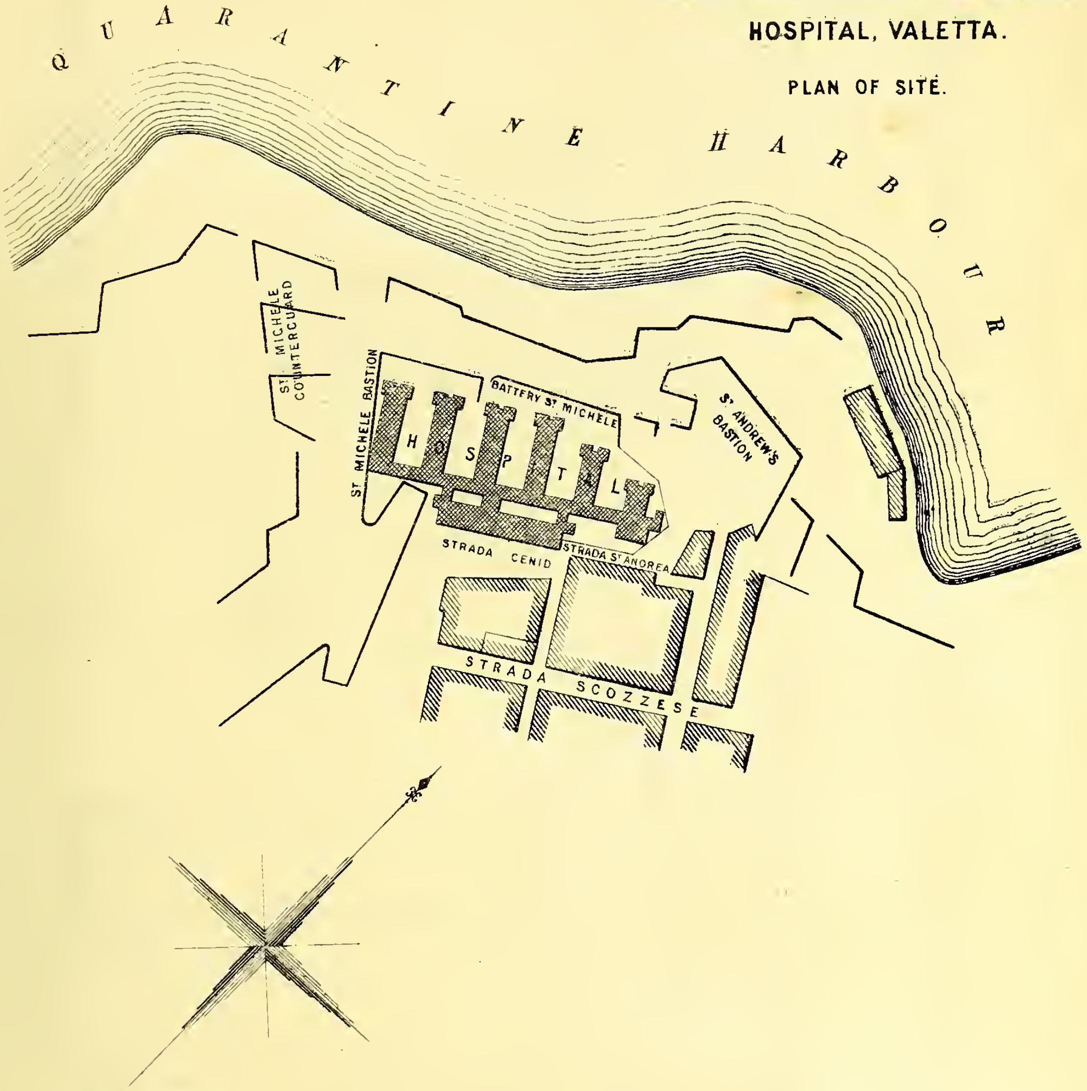
Day & Son, Lithrs to the Queen

PLAN XXVIII.

MALTA.

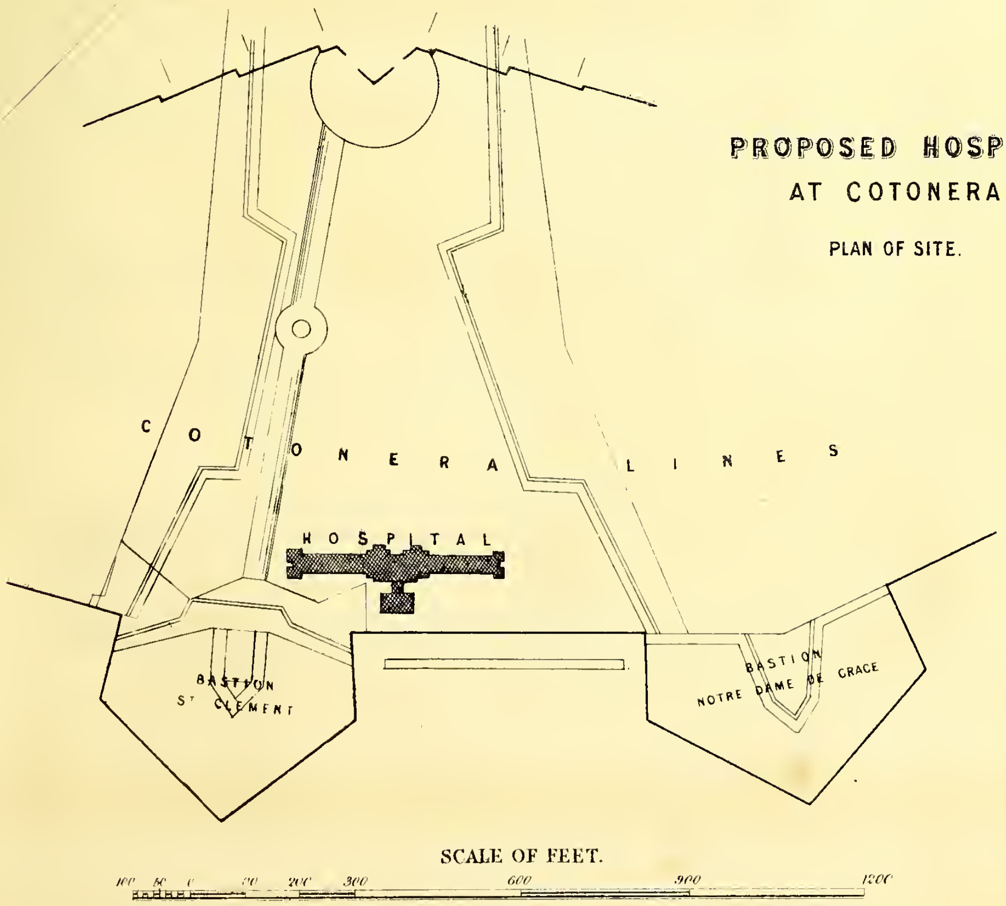
PROPOSED GENERAL MILITARY HOSPITAL, VALETTA.

PLAN OF SITE.


QUARANTINE HARBOUR
S^T MICHELE COUNTERGUARD
S^T MICHELE BASTION
BATTERY S^T MICHELE
HOSPITAL
S^T ANDREW'S BASTION
STRADA CENID
STRADA S^T ANDREA
STRADA SCOZZESE

PROPOSED HOSPITAL AT COTONERA.

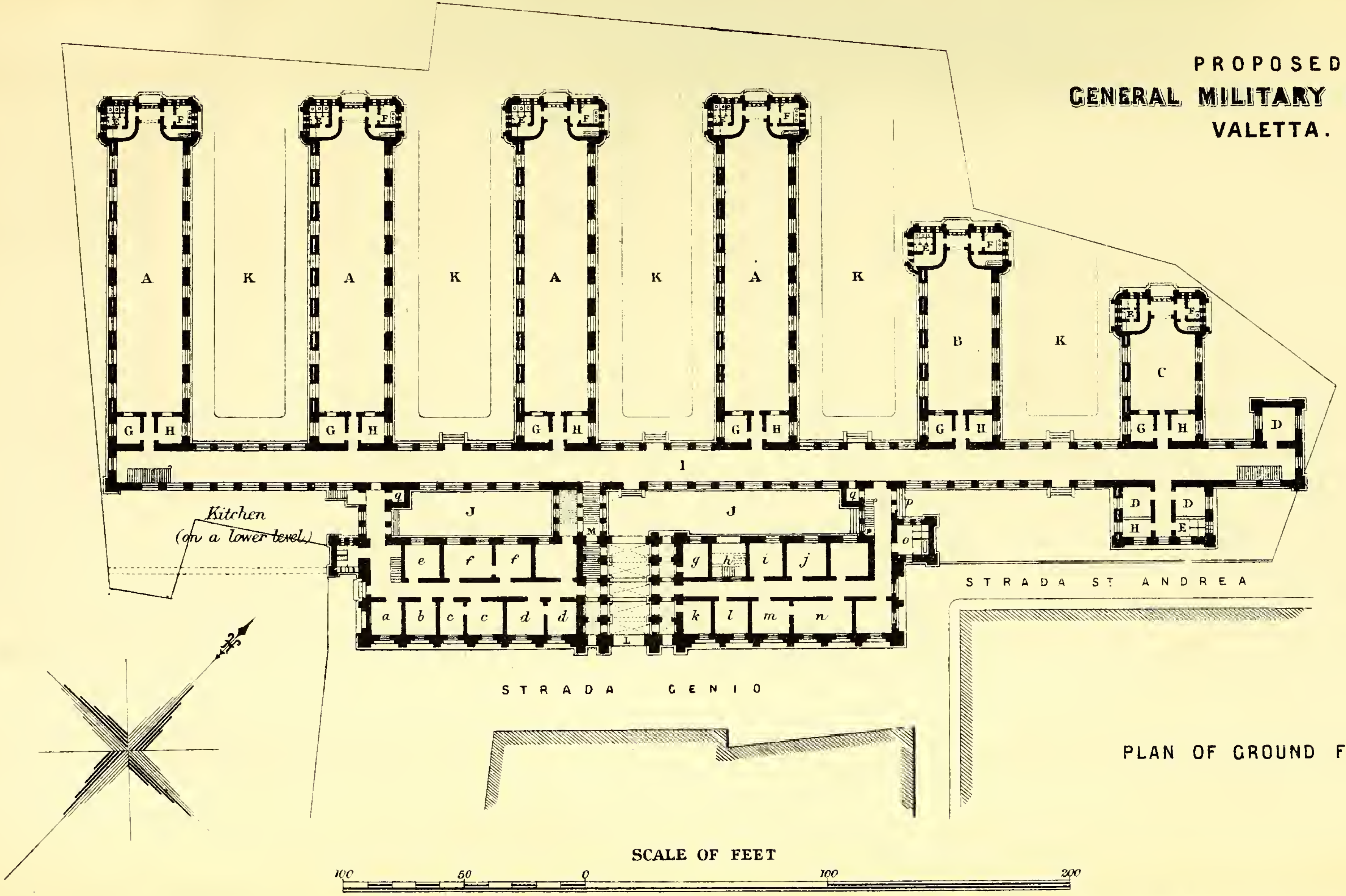
PLAN OF SITE.



Day & Son, Lith^{rs} to the Queen

PLAN XXIX.

PROPOSED
GENERAL MILITARY HOSPITAL.
VALETTA.

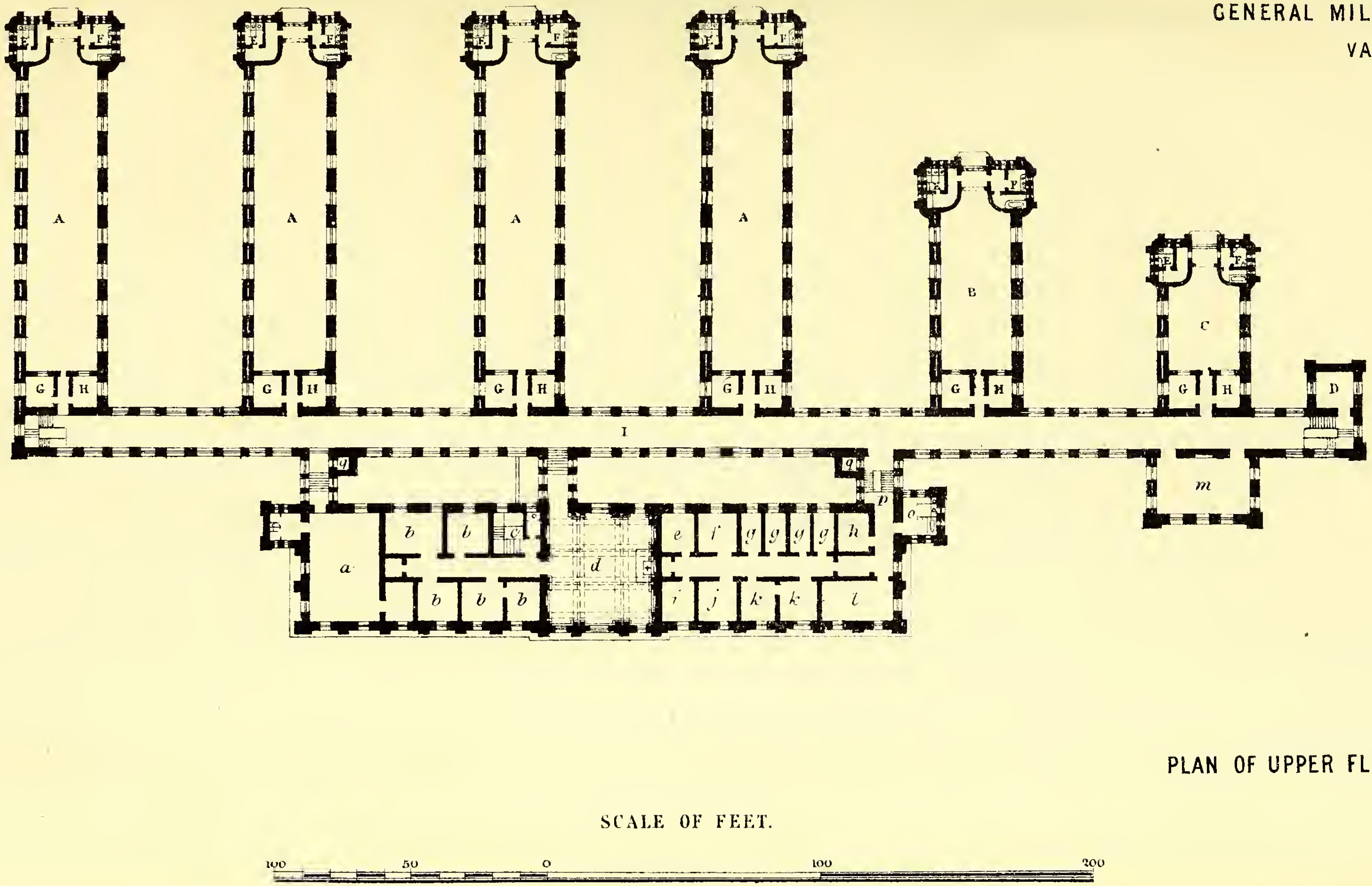


PLAN OF GROUND FLOOR.

Day & Son Lith^rs to the Queen

PLAN XXX.

PROPOSED
GENERAL MILITARY HOSPITAL.
VALETTA.



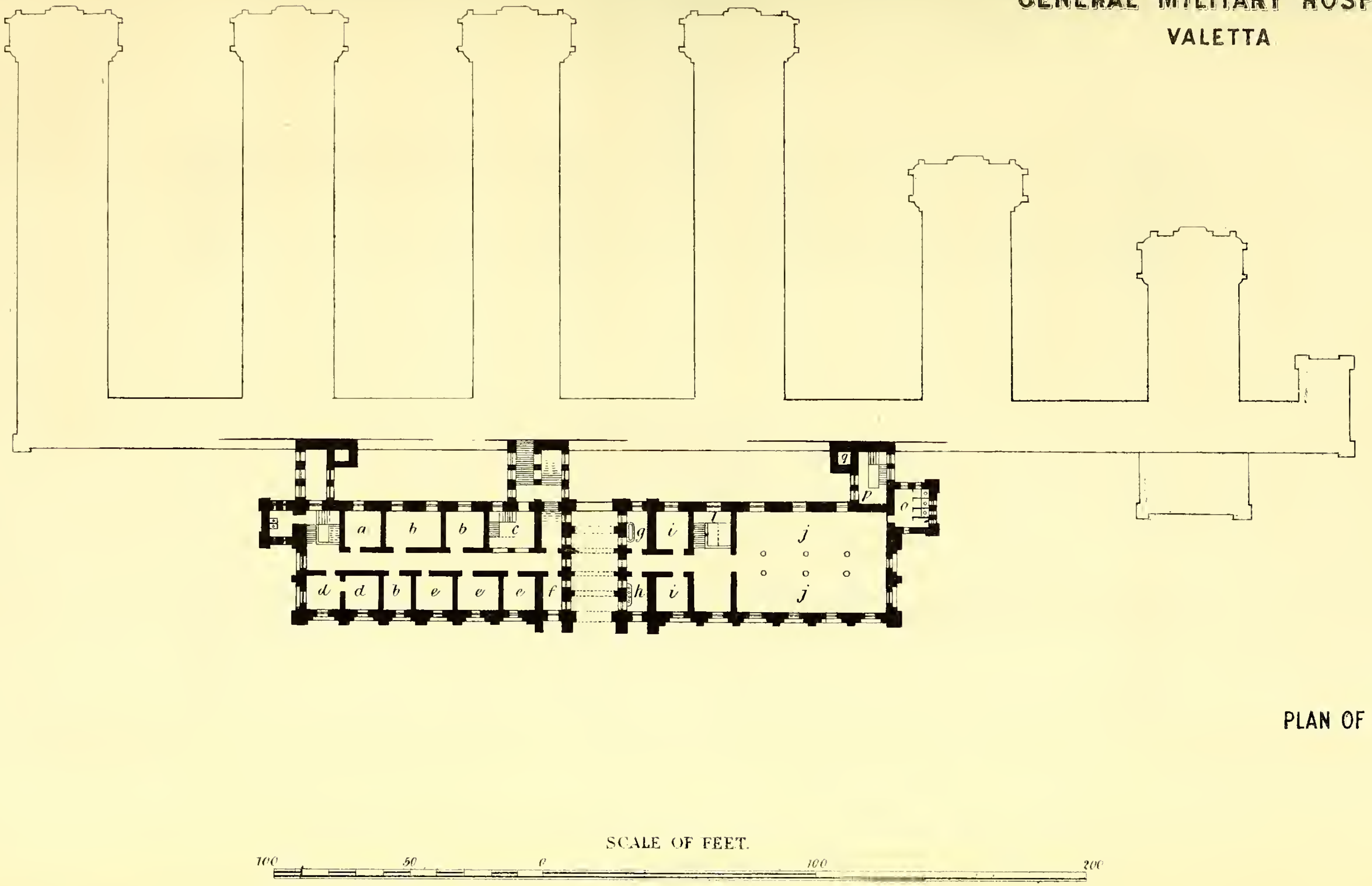
PLAN OF UPPER FLOOR

Day & Son Lith^rs to the Queen.

PROPOSED

GENERAL MILITARY HOSPITAL.

VALETTA.



PLAN OF MEZZANINE.

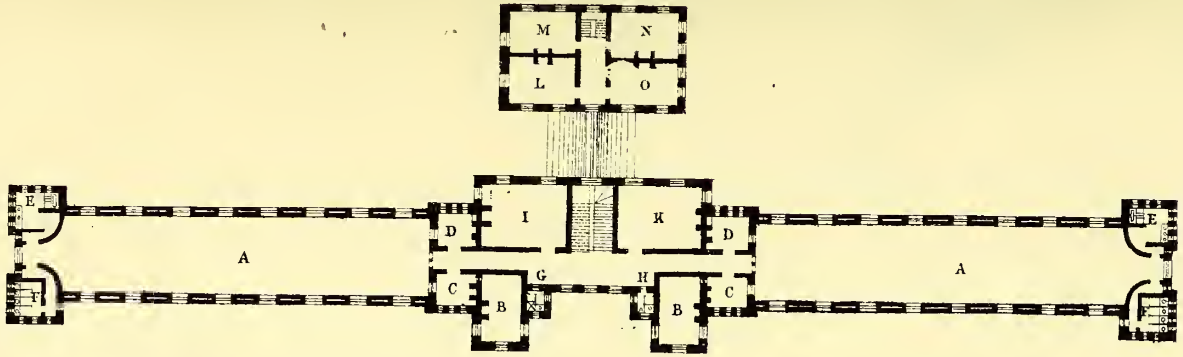
PLAN XXXI.

Day & Son Lithrs to the Queen

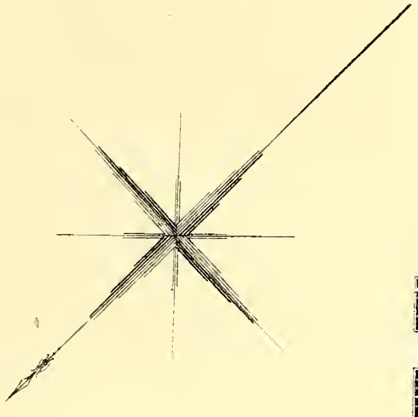
PLAN XXXII.

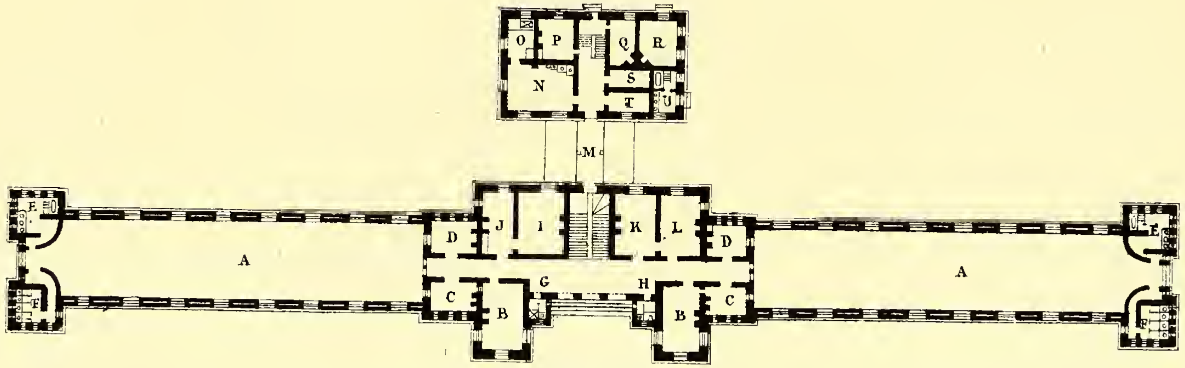
PROPOSED

HOSPITAL AT COTONERA.



FIRST FLOOR PLAN.





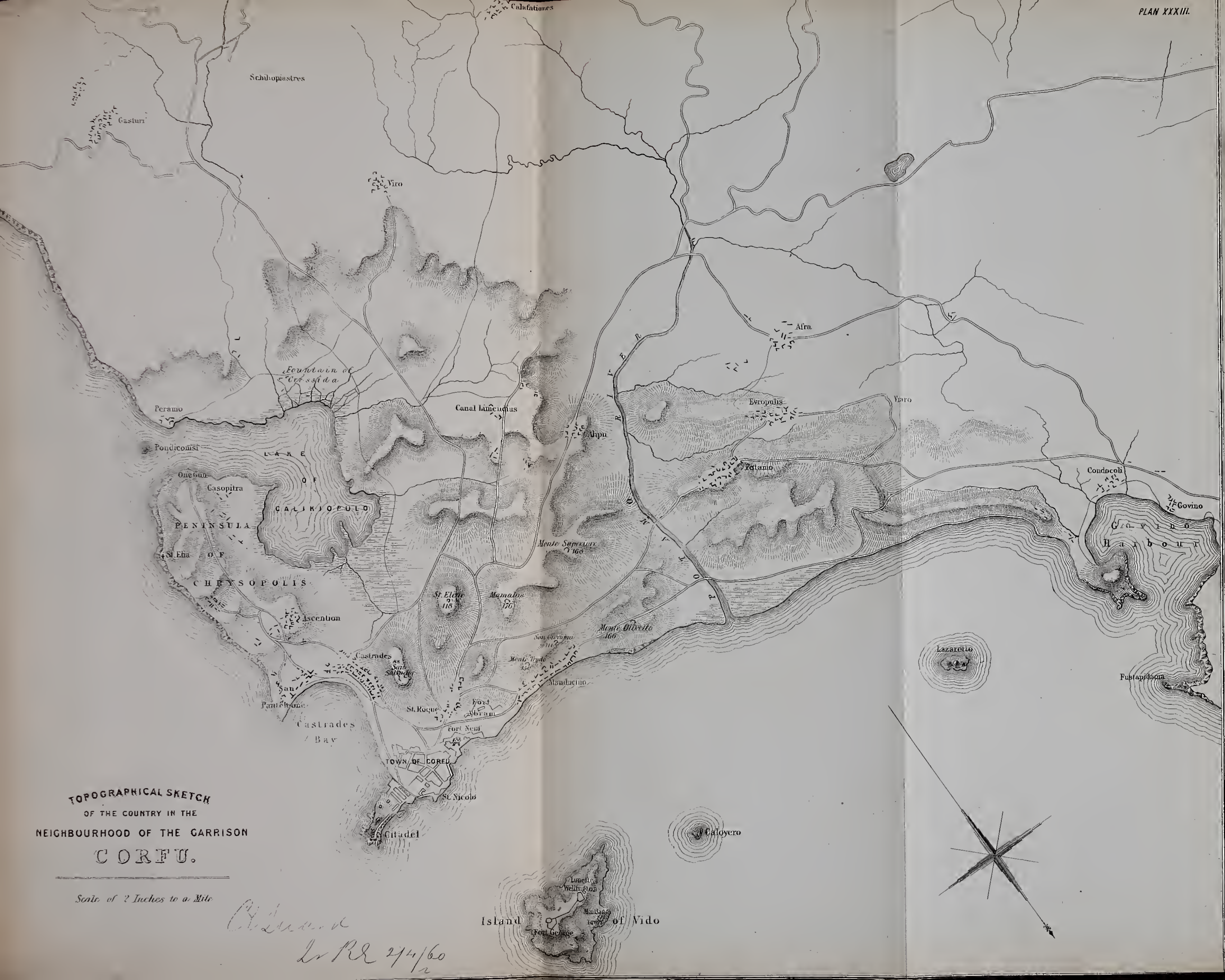
GROUND PLAN.

SCALE OF FEET

Day & Son Lithrs to the Queen

22

PLAN XXXIII.



TOPOGRAPHICAL SKETCH
OF THE COUNTRY IN THE
NEIGHBOURHOOD OF THE GARRISON
CORFU.

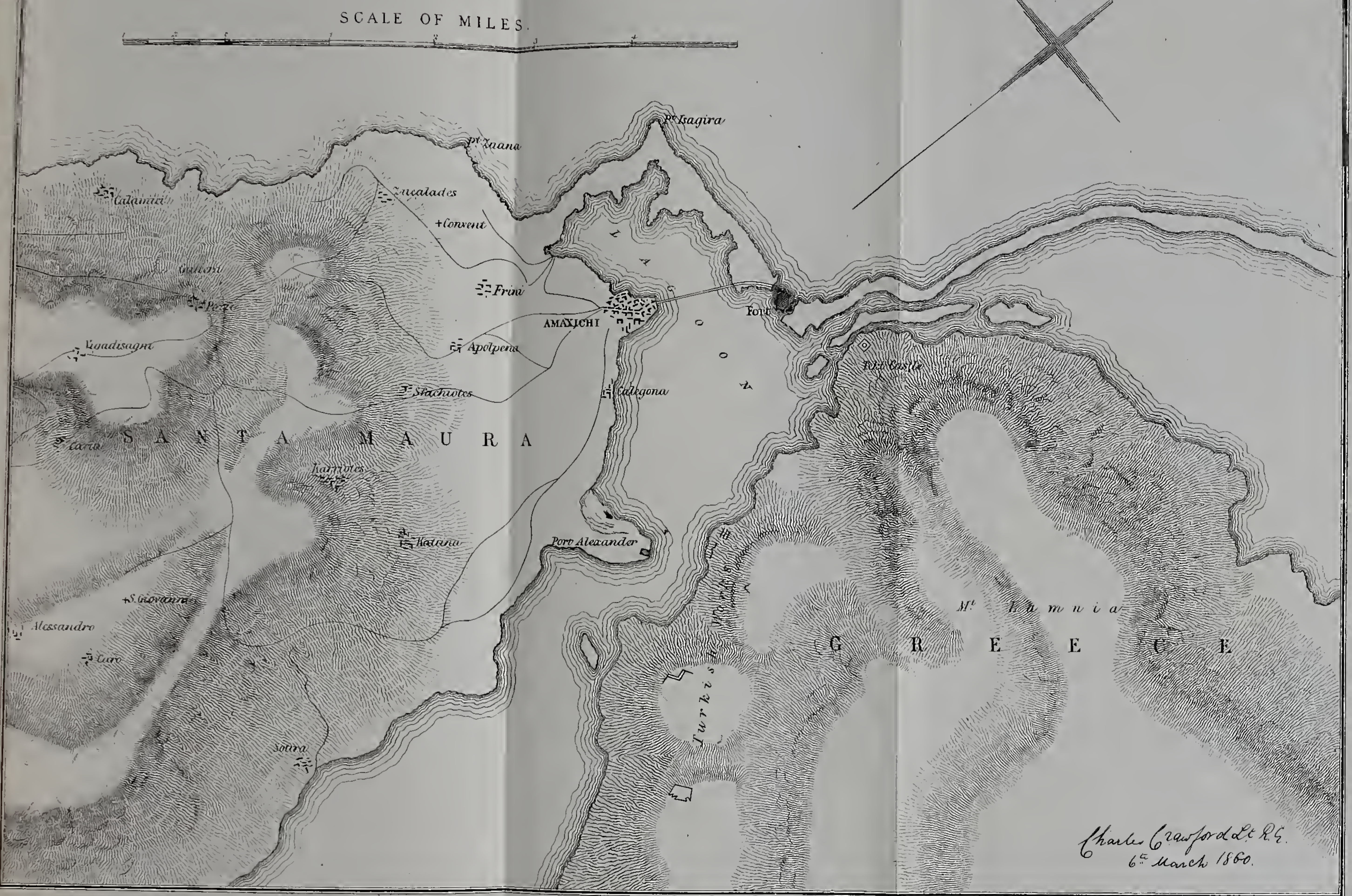
Scale of 2 Inches to a Mile

Lr RE 2/4/60

22

PLAN XXXIV.

SANTA MAURA



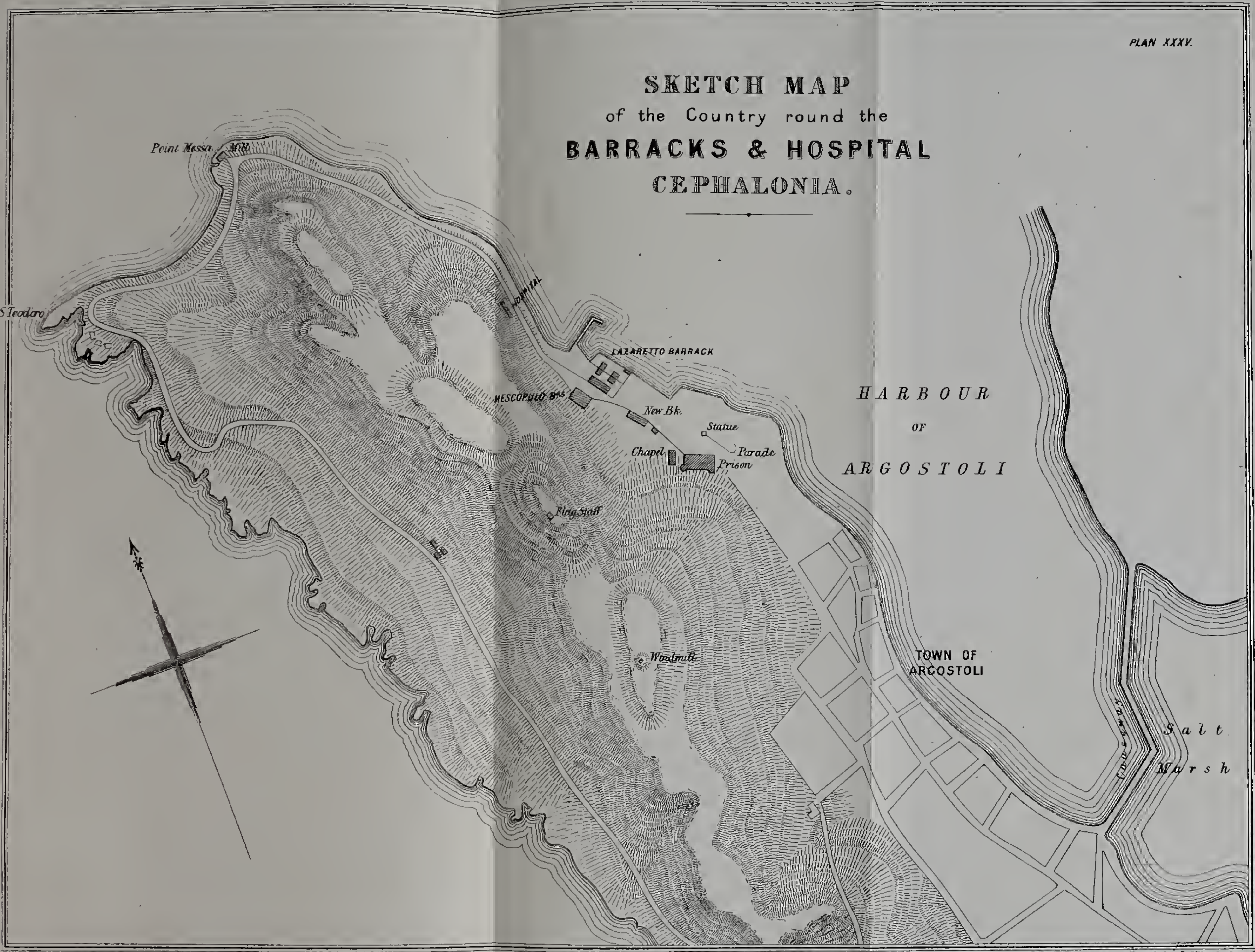
Charles Crawford Lt. R.E.
6th March 1860.

Day & Son, Lithrs to the Queen

22 A[illegible]

PLAN XXXV.

SKETCH MAP
of the Country round the
BARRACKS & HOSPITAL
CEPHALONIA.



Day & Son, Lithrs. to the Queen

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8 5. 30